UNITED STATES AIR FORCE

OCCUPATIONAL SURVEY REPORT

SOFTWARE MANAGEMENT, ACQUISITION, AND DEVELOPMENT
OCCUPATIONAL SURVEY REPORT

SMAD

AFPT 90-49X-808 AND 90-SWM-915

MAY 1990

OCCUPATIONAL ANALYSIS PROGRAM
USAF OCCUPATIONAL MEASUREMENT CENTER
AIR TRAINING COMMAND
RANDOLPH AFB, TEXAS 78150-5000

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HQ ATC/XP	1			
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HQ ESC/TTGT	1			
HQ MAC/DPAT	3			
HQ MAC/SCU	1			
HQ MAC/TTGT	1			
HQ MAC/XR	1			
HQ PACAF/DPAT	3			
HQ PACAF/TTGT	1			
HQ SAC/DPAT	3			
HQ SAC/TTGT	1			
HQ SAC/XR	1			
HQ SAC/XRF	1			
HQ SSC/XP	1			
HQ TAC/DPATJ	3			
HQ TAC/SCKC	1			
HQ TAC/SCX	1			
HQ TAC/TTGT	1			
HQ TAC/TTO	1			
HQ USAF/DPC	1			
HQ USAF/DPP	1			
HQ USAF/SC	1			
HQ USAF/SCE	1			
HQ USAF/SCW	1			
HQ USAF/DPPE	1			
HQ USAF/LE-RD	1			
HQ USAF/LEYYS	1			
HQ USAFE/DPAT	3			
HQ USAFE/TTGT	1			
NODAC	1			
NSIA	1			
SAF/AQX	1			
SAF/RL	1			
SCD/CC	1			
SCD/CV	1			
SSC/CC	1			
3300 TCHTW/TTGX (KEESLER AFB MS)	1			
3300 TCHTW/TTS (KEESLER AFB MS)	1			
USAFOMC/OMYXL	10	2m	5	10
USMC (CODE TE-310)	1			
3507 ACS/DPKI	1			
6575 SCHS/DPASC	1			

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PREFACE

This occupational survey report (OSR) presents the software-related results of three Air Force Occupational Surveys. Specialties covered in this report include: The Scientific and Development Engineering career area (AFSCs 261X, 262X, 268X, 27XX, 281X, 282X, 284X, and 288X), the Communications-Computer Systems career area (AFSCs 49XX), Officer C and D prefixes, and related civilian occupational series. Authority for conducting occupational surveys is contained in AFR 35-2. Computer products used in this report are available for use by operations and training officials.

The original survey instrument for this project was developed by Lieutenant Richard Brull, Occupational Analyst, with subsequent editions developed by Lieutenant William P. Knoll, Occupational Analyst. Ms Olga Velez and Ms Becky Hernandez provided computer support for the project. Lieutenant Knoll analyzed the data and wrote the final report. Administrative support was provided by Ms Tamme Lambert. This report has been reviewed by Mr Gerald R. Clow, Chief, Management Applications Branch, USAF Occupational Measurement Center.

Copies of this report are distributed to Air Staff sections, Major Commands, and other interested training and management personnel (see distribution on page i). Additional copies are available upon request to the USAF Occupational Measurement Center, Attention: Chief, Occupational Analysis Division (OMY), Randolph Air Force Base, Texas 78150-5000.

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SUMMARY OF RESULTS

1. Survey Coverage: Survey results are based on responses from a representative sample of 4,337 Communications-Computer personnel, 2,663 Scientific and Development Engineering personnel, and 1,946 civilian personnel with software-related occupational series. These samples were then refined to eliminate those personnel spending less than 10 percent of their time on software-related duties. This refinement left a total of 2,975 Communications-Computer personnel, 959 Scientific and Development Engineering personnel, and 1,417 civilian personnel.

2. Software-Related Job Structure: Job structure analysis revealed three jobs and three clusters in the Scientific and Development Engineering sample, and three jobs and three clusters in the Communications-Computer sample. Similar jobs were identified in each sample, and functions performed by various other jobs in one sample were performed by jobs in the other sample.

3. DAFSC Analysis: In both military samples, DAFSC descriptions clearly reveal specific DAFSCs concerned with the development of software, the management of software, and the acquisition of software. Across DAFSCs within utilization fields, there was a definite trend toward higher performance of program and project management and acquisition and contracting duties at the staff level DAFSC.

4. Summary of Background Information: Background questions revealed a slightly higher percentage of 49XX personnel planning to cross-train to another utilization field than Scientific and Development Engineering personnel. Also, Scientific and Development Engineering personnel had a slightly higher level of education than 49XX personnel, and the civilian personnel had a generally lower level of education than the military personnel. Last of all, Scientific and Development Engineering personnel, Communications-Computer personnel, and civilian personnel all use similar programming languages, with Fortran being the most commonly used programming language.

5. Implications: A small core of Scientific and Development Engineering personnel is performing software-related functions. The software-related functions performed by these personnel are similar to the software-related functions performed by Communications-Computer personnel.

OCCUPATIONAL SURVEY REPORT
SOFTWARE MANAGEMENT, ACQUISITION AND DEVELOPMENT FUNCTIONS PERFORMED BY AFSCs 261X, 262X, 268X, 27XX, 281X, 282X, 284X, 288X, 49XX, OFFICER C AND D PREFIXES, AND RELATED CIVILIAN OCCUPATIONAL SERIES

INTRODUCTION

This report summarizes the results of three occupational surveys of Air Force specialties and occupational series associated with software management, acquisition, and development duties. The surveys were requested by the Software Management Group (HQ USAF/SCW) as part of the Software Management Broad Area Review. The USAF Occupational Measurement Center's purpose in conducting these surveys is to: 1) identify personnel performing software management, acquisition, and development functions, and 2) identify the software management, acquisition, and development functions being performed. The surveys were completed by the Occupational Analysis Division, USAF Occupational Measurement Center. Table 1 shows the AFSCs and the titles of those AFSCs, as well as pertinent civilian occupational series, represented in this report.

Keywords: Job analysis, Job satisfaction, Air Force training, Personnel development, Career ladders. (SDC)

SURVEY METHODOLOGY

Survey Development

Data for this report were collected using a USAF Job Inventory (AFPT 90-49X-808) developed for the Communications-Computer career area (AFSC 49XX), and two subsequent variations of the original 49XX Job Inventory. The 49XX Job Inventory was developed through review of pertinent career area publications, previous survey instruments, and personal interviews with subject-matter experts at bases representative of the career area to ensure thorough coverage of the various functions performed within the career area. In addition, subject-matter experts representing the major commands and the Air Staff reviewed and validated the survey instrument at a validation workshop held at the Occupational Measurement Center, Randolph AFB TX.

The original 49XX Job Inventory consisted of 1,284 tasks, divided into 18 functional areas or duties. Functional representatives from the Software Management Group then determined six of the areas from the original inventory defined the software management, acquisition, and development spectrum of functions in which they were interested. Using those six duties, a second job inventory was developed to collect software management, acquisition, and development task data performed by Scientific and Development Engineering career area personnel (including officer C and D prefix personnel). A third

TABLE 1

AFSCS COVERED IN THIS REPORT

AFSC	TITLE
2611/6	SCIENTIFIC MANAGER
2621/5	COMPUTER RESEARCH SCIENTIST
2681/5	SCIENTIFIC ANALYST
2711/6	ACQUISITION MANAGEMENT OFFICER
2721/4	ACQUISITION PROJECT OFFICER
2731/6	COMPUTER SYSTEMS ACQUISITION MANAGER
2811/6	STAFF DEVELOPMENT ENGINEERING MANAGER
2821/5	ELECTRONIC ENGINEER
2841/5	ASTRONAUTICAL ENGINEER
2881/5	COMPUTER SYSTEMS ENGINEER
4911/6	COMMUNICATIONS-COMPUTER SYSTEMS STAFF OFFICER
4921/5	COMMUNICATIONS-COMPUTER SYSTEMS PROGRAMMING AND ANALYSIS OFFICER
4931/5	COMMUNICATIONS-COMPUTER SYSTEMS ENGINEER
4941/5	COMMUNICATIONS-COMPUTER SYSTEMS OFFICER
C PREFIX	FUNCTIONAL AUTOMATED APPLICATIONS ANALYST
D PREFIX	AUTOMATED SYSTEMS PROGRAM DESIGNER

CIVILIAN OCCUPATIONAL SERIES COVERED IN THIS REPORT

OCCUPATIONAL SERIES	TITLE
0301	MISCELLANEOUS ADMINISTRATION AND PROGRAM
0334	COMPUTER SPECIALIST
0801	GENERAL ENGINEERING
0855	ELECTRONIC ENGINEERING
0861	AERONAUTICAL ENGINEERING
1310	PHYSICS
1515	OPERATIONS RESEARCH
1550	COMPUTER SCIENCE

survey collapsed the tasks contained in the six duties into nine functional statements to collect software management, acquisition, and development data from Air Force civilian personnel. Listed below are the six duties isolated from the original 49XX Job Inventory as representing the spectrum of software related functions:

SYSTEMS DEVELOPMENT
CONFIGURATION MANAGEMENT AND QUALITY ASSURANCE
TESTING AND EVALUATION
PROGRAM AND PROJECT MANAGEMENT
ACQUISITION AND CONTRACTING
DATA BASE MANAGEMENT

Survey Administration

From September 1987 through March 1988, Survey Control Officers at Consolidated Base Personnel Offices distributed the 49XX job inventories to 49XX personnel. From August 1989 to November 1989, Survey Control Officers also distributed software management, acquisition, and development job inventories to Scientific and Development Engineering personnel. Military participants were selected from a computer-generated mailing list provided by the Air Force Human Resources Laboratory. Civilian participants were selected by the three major commands utilizing civilians involved with software (AFSC, AFLC, and AFCC), with the final selections coordinated through AFCC/SA. Civilian participants had the job inventories mailed directly to them, with return envelopes.

To complete the survey, each incumbent first answered the background questions, then marked the tasks he or she performed. Finally, the incumbent rated each task performed according to the relative time spent performing that task. Ratings range from 1 (a very small amount of time spent) to 9 (a very large amount of time spent). As part of the computer analysis, all of an incumbent's ratings are combined, and the total was assumed to represent 100 percent of the individual's time on the job related to software management, acquisition, and development. This procedure provides a basis for comparison of duties and tasks performed.

Survey Sample

A total of 4,337 AFSC 49XX officers and 2,663 Scientific and Development Engineering officers were sampled. Tables 2, 3, and 4 compare characteristics of the 49XX sample with the 49XX population characteristics. Tables 5, 6, and 7 compare the characteristics of the Scientific and Development Engineering sample with the survey eligible population. At a pre-Broad Area Review meeting held at the USAF Occupational Measurement Center, MAJCOM and Air Staff representatives chose to delete the data collected from all personnel who spent zero or less than 10 percent of their job time on software-related duties. The deletion of those personnel left a total of 2,975 49XX personnel and 959 Scientific and Development Engineering personnel. The civilian sample

TABLE 2

DISTRIBUTION OF 49XX PERSONNEL BY RANK

RANK	PERCENT OF ASSIGNED	PERCENT OF SAMPLE
LIEUTENANT	33	33
CAPTAIN	47	47
MAJOR	13	13
LIEUTENANT COLONEL	6	6
COLONEL	1	*

* Indicates less than 1 percent

TABLE 3

DISTRIBUTION OF 49XX PERSONNEL BY SPECIALTY

DUTY AFSC	PERCENT OF ASSIGNED	PERCENT OF SAMPLE
491X	28	26
492X	35	35
493X	9	9
494XA	10	10
494XB	7	7
494XC	11	13

TABLE 4

DISTRIBUTION OF 49XX PERSONNEL BY MAJOR COMMAND

MAJCOM	PERCENT OF ASSIGNED	PERCENT OF SAMPLE
AFCC	49	46
AFSPACECOM	7	8
TAC	6	9
AFSC	5	5
ATC	4	4
ESC	4	4
AU	4	3
USAFE	2	1
AFLC	1	2
SAC	1	2
AFMPC	1	2
MAC	1	1
OTHER	15	13

TABLE 5

DISTRIBUTION OF 26XX, 27XX, AND 28XX PERSONNEL BY RANK***

RANK	PERCENT OF ELIGIBLE	PERCENT OF SAMPLE
LIEUTENANT	28	30
CAPTAIN	38	38
MAJOR	17	17
LIEUTENANT COLONEL	14	12
COLONEL	4	3

TABLE 6

DISTRIBUTION OF 26XX, 27XX, AND 28XX PERSONNEL BY SPECIALTY***

DUTY AFSC	PERCENT OF ELIGIBLE	PERCENT OF SAMPLE
261X	3	3
262X	*	1
268X	5	6
271X	14	10
272X	17	18
273X	*	*
281X	11	9
282X	30	30
284X	5	5
288X	4	4
C-Prefix	10	9
D-Prefix	1	*

* Indicates less than 1 percent
** Includes C and D prefix personnel
*** Columns may not total 100 percent due to rounding or nonresponse

TABLE 7

DISTRIBUTION OF 26XX, 27XX, AND 28XX PERSONNEL BY MAJCOM**

MAJCOM	PERCENT OF ELIGIBLE	PERCENT OF SAMPLE
AFSC	62	67
AFLC	4	4
AU	6	4
TAC	3	4
MAC	3	3
ESC	3	3
AFSPACECOM	3	2
HQ USAF	2	2
AFOTEC	1	2
AFTAC	1	2
OTHER	12	7

* Includes C and D prefix personnel
** Columns may not total 100 percent due to rounding or nonresponse

was also refined this way, leaving 1,417 civilians from an original 1,946 civilians. Figure 1 shows the percent of 49XX personnel spending over 10 percent of their time on software-related duties. Figures 2 and 3 display similar information for the Scientific and Development Engineering personnel and civilian personnel.

JOB STRUCTURE
(Career Area/Utilization Field Structure)

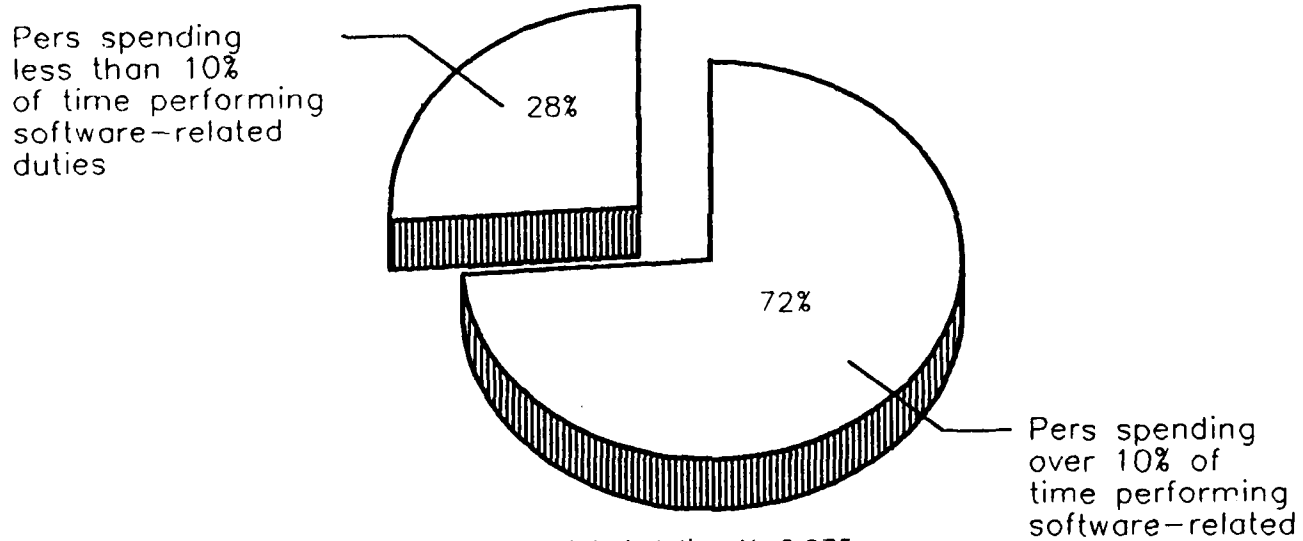
An important function of the USAF Occupational Analysis Program is examining the job structure of a career area or utilization field. Based on incumbent responses to the survey, groups of incumbents spending similar amounts of time performing similar tasks are identified. Individuals performing many of the same tasks and spending similar amounts of time on those tasks group together to describe a job performed in the career area. When there are variations in the combinations of tasks and time spent on tasks by sample respondents, different jobs are identified. When there is a substantial degree of similarity between different jobs, they are grouped together and labeled as clusters. In this way, the basic structure of a career area or utilization field, in terms of the jobs performed and their relationship to each other, are described. This analysis provides a foundation for evaluating other aspects within a career area or utilization field, such as personnel classification, AFR 36-1 Specialty Descriptions, and training considerations. In this report, only the part of the incumbents' jobs dealing with software, as described by the six isolated functional areas specified by the Software Management Group, will be covered.

Structure Overview

Based on variations in combinations of tasks performed, structure analysis identified three clusters and three separate jobs within the Scientific and Development Engineering survey sample. The division of software-related jobs performed within the Scientific and Development Engineering career area is shown below. The number of personnel in each group (N) is also shown. The Communications-Computer job structure is presented immediately after the Scientific and Development Engineering group descriptions. Within the 49XX survey sample, three clusters and three jobs were identified. Since the survey sent to civilian personnel collapsed the tasks statements contained in the two military surveys into nine functional statements, task data and a civilian software-related job structure will not be given.

FIGURE 1

PERCENT OF AFSC 49XX SAMPLE
PERFORMING SOFTWARE-RELATED DUTIES



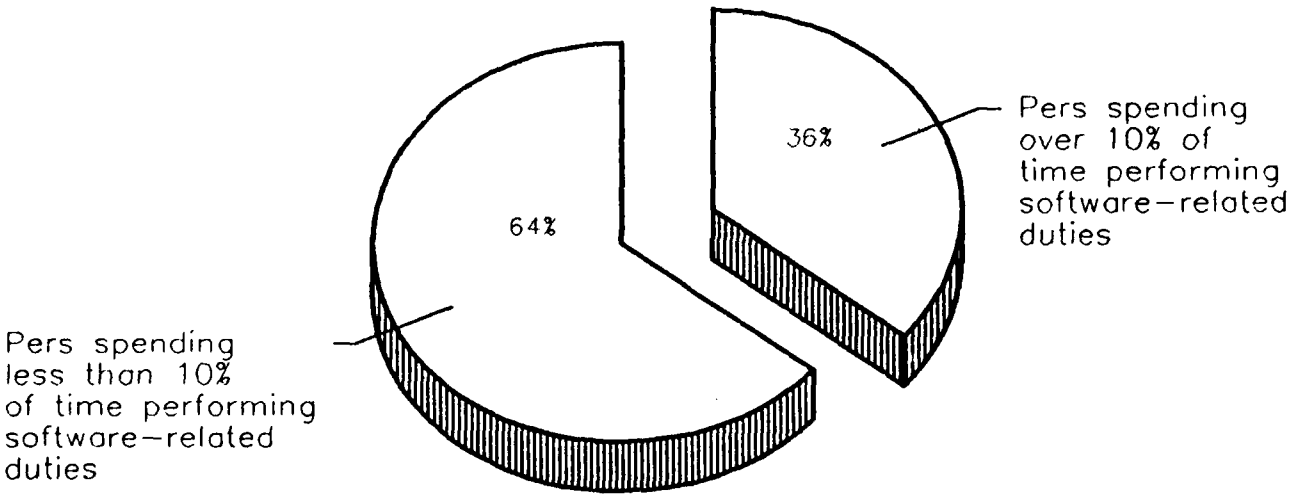
Over 10% of time performing software-related duties N=2,975

Less than 10% of time performing software-related duties N=1,171

Total Sample = 4,146

FIGURE 2

PERCENT OF SCIENTIFIC AND DEVELOPMENT ENGINEERING SAMPLE PERFORMING SOFTWARE-RELATED DUTIES



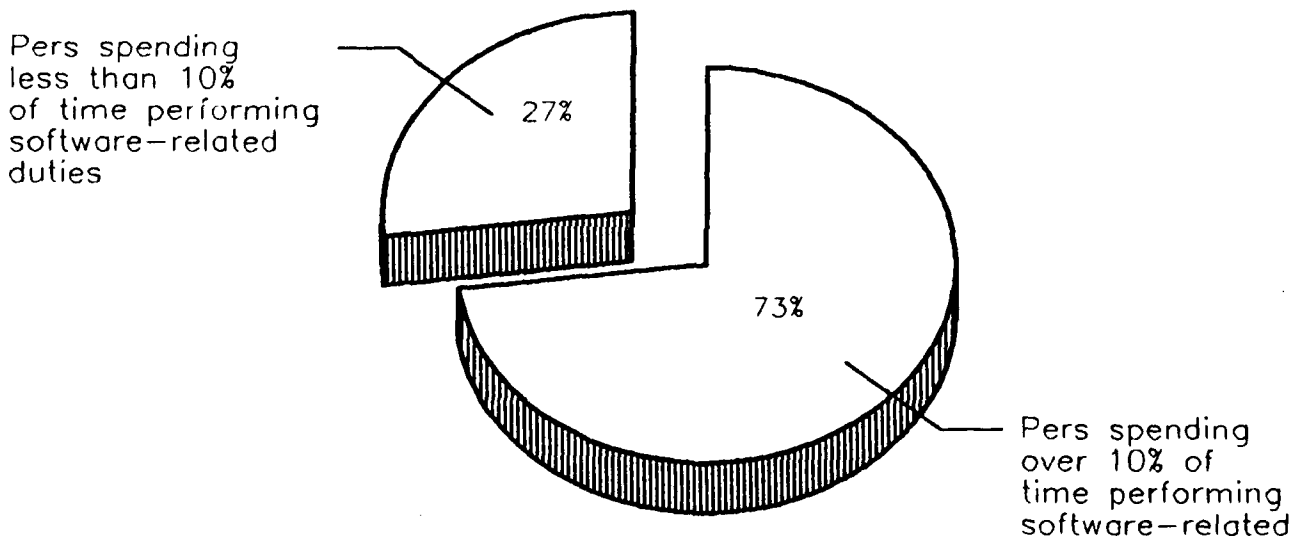
Over 10% of time performing software-related duties N=959

Less than 10% of time performing software-related duties N=1,704

Total Sample = 2,663

FIGURE 3

PERCENT OF CIVILIAN SAMPLE
PERFORMING SOFTWARE-RELATED DUTIES



Over 10% of time performing software-related duties N=1,417

Less than 10% of time performing software-related duties N=526

Total Sample = 1,943

Scientific and Development Engineering
Software Management, Acquisition, and Development Specialty Jobs
(AFSC 262X, 268X, 261X, 27XX, 282X, 284X, 288X, 281X, and
Officer C and D Prefix)

I. SYSTEMS MANAGER CLUSTER (N=119)

- A. Systems Software Engineers (N=43)
- B. Software Acquisition Officers (N=6)
- C. Software Contract Monitors (N=5)
- D. Software Evaluators (N=6)
- E. Testing Personnel (N=37)
- F. Systems Evaluators (N=5)
- G. Problem Solvers (N=12)

II. PROGRAM AND PROJECT MANAGEMENT CLUSTER (N=298)

- A. Program Managers (N=73)
- B. Program and Contract Managers (N=155)
- C. Request for Proposal Contracting Managers (N=28)

III. SYSTEMS DEVELOPMENT CLUSTER (N=245)

- A. Customer Support Personnel (N=20)
- B. Systems Data Base Development Personnel (N=12)
- C. Applications Programmers (N=143)
- D. Data Base Analysts (N=28)

IV. SYSTEMS EVALUATION AND DEVELOPMENT PERSONNEL (N=49)

V. CONTRACTING OFFICERS (N=11)

VI. DATA BASE MANAGERS (N=5)

Group Descriptions

The following paragraphs briefly describe the different jobs identified in the analysis of the Scientific and Development Engineering career area. Time spent on software-related duties for each group identified is displayed in Table 8. For a more detailed listing of representative tasks and a summary of background data on these jobs, see Appendix A.

I. SYSTEMS MANAGER CLUSTER (N=119). Systems Managers have a balanced job of managing various automated systems. This group places approximately equal emphasis on four duties: Program and Project Management, Testing and Evaluation, Configuration Management and Quality Assurance, and Systems Development. Seventy-one percent of these personnel hold a 28XX duty AFSC, with 39 percent holding a 282X duty AFSC (Electronic Engineer). Average Total Active Federal Military Service (TAFMS) for this group is 105 months. Representative tasks for this cluster are presented below:

TABLE 8

PERCENT TIME SPENT ON SOFTWARE MANAGEMENT, ACQUISITION, AND DEVELOPMENT DUTIES BY SCIENTIFIC AND DEVELOPMENT ENGINEERING CLUSTERS OR JOBS

PERCENT TIME SPENT	SYSTEMS MANAGERS	PROGRAM AND PROJECT MANAGEMENT PERSONNEL	SYSTEMS DEVELOPMENT PERSONNEL	SYSTEMS EVALUATION AND DEVELOPMENT PERSONNEL	CONTRACTING OFFICERS	DATA BASE MANAGERS
11-20%	21	24	17	45	27	40
21-30%	15	21	14	16	36	0
31-40%	8	7	13	12	18	20
41-50%	9	7	8	14	0	20
51-60%	5	10	10	0	0	0
61-70%	8	8	9	4	9	0
71-80%	10	9	13	4	0	0
81-90%	13	7	9	0	0	0
91-100%	11	8	8	4	9	20

* Column may not total 100 percent due to rounding or nonresponse

Evaluate test reports
Participate in Technical Interchange Meetings (TIM)
Evaluate functional requirements documents/specifications
Conduct or participate in operational tests or evaluations
Evaluate computer software test plan
Review functional requirements specifications
Analyze system performance characteristics

This cluster accounted for 16 percent of the Scientific and Development Engineering sample. Within this cluster, seven jobs were identified. The largest job identified was the Systems Software Engineers (N=43). These engineers manage software for the various systems they work with. The next job identified was the Software Acquisition Officers (N=6). These officers were responsible for acquiring software for the system they worked with, and their jobs centered around Acquisition and Contracting and Systems Development duties. These personnel had the highest TAFMS in the cluster with an average of 141 months. Software Contract Monitors (N=5) was the next job identified. These personnel performed many Program and Project Management and Contracting tasks. Software Contract Monitors performed a monitoring role of the contractors involved with their system or program. These officers were the most junior in the cluster with an average TAFMS of 67 months. Personnel in the fourth job, Software Evaluators (N=6) were responsible for evaluating software and ensuring its quality. Testing Personnel (N=37) was the fifth job identified. These personnel were responsible for performing systems tests and evaluating the results of those tests. Systems Evaluators (N=5) was the next job identified. These officers evaluated systems designs or analyzed systems performance characteristics. The last job identified was the Problem Solvers (N=12). These personnel determined causes of software problems and then determined corrective actions to resolve those problems.

II. PROGRAM AND PROJECT MANAGEMENT CLUSTER (N=298). These officers are responsible for all aspects dealing with program and project management. Activities characteristic of this group are conducting program management meetings or briefings, coordinating program management matters with civilian companies or contracting personnel, and evaluating various program documents. Forty-one percent of these officers were 27XX personnel, while another 41 percent of these personnel were 28XX personnel. Average TAFMS for this group was 136 months. Tasks representative of this group include:

Estimate impact on programs or projects due to delays
Brief at program management reviews
Defend program or project schedules or milestones
Coordinate with supporting activities on their ability to support systems, subsystems, facilities, or equipment
Observe contractor demonstrations
Participate in Technical Interchange Meetings (TIM)

Within this cluster, three jobs were identified. The first job identified was the Program Managers (N=73). These officers performed a similar job to the rest of the personnel in the cluster, except their job was much more focused on the performance of Program and Project Management tasks. This group was the most senior in the cluster with an average TAFMS of 152 months. The second job in this cluster was the Program and Contracting Managers (N=155). This job was the largest in the cluster, and its members placed strong emphasis on the performance of Program and Project management duties, as well as heavy emphasis on contracting duties. The last job in the cluster was the Request for Proposal Contracting Managers (N= 28). These respondents had a heavy emphasis on the performance of contracting functions. Within the contracting spectrum, these officers were heavily involved with Request For Proposals (RFP), performing such functions as drafting inputs to RFP items, developing RFPs, and consolidating RFP item inputs. The 298 members in this cluster accounted for 31 percent of the Scientific and Development Engineering sample.

III. SYSTEMS DEVELOPMENT CLUSTER (N=245). The 245 officers in this cluster grouped together based on the strong emphasis and frequent performance of Systems Development functions. The most common AFSC in this cluster was 282X, which accounted for 33 percent of these personnel. Overall, 52 percent of these personnel held a 28XX AFSC. Average TAFMS for this cluster was 99 months. Typical tasks performed by the members of this cluster include:

Write or modify computer source code
Compile or assemble computer programs
Analyze computer applications software for modifications
Assist users in resolving computer software malfunctions or problems
Maintain computer files, such as data or program files
Design computer applications software to fulfill user requirements
Test and debug program modules

This cluster accounted for 26 percent of the Scientific and Development Engineering sample. Within this cluster, four jobs were identified. The first job identified was the Customer Support Personnel (N=20). These officers performed systems development functions and assisted users with their software familiarization and software problems. The second job, Systems Data Base Development Personnel (N=12), were those officers responsible for updating or developing data bases on systems. Applications Programmers (N=143) was the largest job identified in this cluster. These personnel were responsible for developing, implementing, and maintaining software. The last job identified in this cluster was the Data Base Analysts (N=28). These personnel analyzed data base structures and wrote programs which interacted with data bases.

IV. SYSTEMS EVALUATION AND DEVELOPMENT PERSONNEL (N=49). The members of this group were responsible for evaluating and developing systems. The most common AFSC for these officers was 282X. Average TAFMS for this group was 107 months. Representative tasks for this group appear below.

Analyze system performance characteristics
Conduct or participate in operational tests or evaluations
Participate in Technical Interchange Meetings (TIM)
Evaluate test reports
Evaluate acceptance tests on systems, subsystems, facilities, or equipment
Evaluate vendor-supplied documentation or products
Participate in design analyses, project team meetings, or internal design review meetings

The members in this job accounted for 5 percent of the Scientific and Development Engineering sample.

V. CONTRACTING OFFICERS (N=11). These 11 individuals are responsible for all activities concerned with contracting. Their primary job emphasis lay in the Acquisition and Contracting area, with secondary emphasis on the Program and Project Management area. Average TAFMS for this group was 124 months. Typical tasks performed by this group are:

Coordinate with contracting officers on contract specifications
Draft or write inputs to RFP items, such as CDRL, SOW, DID, CLIN, or PWS
Prepare Statements of Work (SOW) for programs or projects
Coordinate modifications to contracts
Evaluate SOW or specifications for solicitations
Coordinate with legal personnel or contracting officers on technical aspects of contracts, bids, or proposals

This job accounted for 1 percent of the Scientific and Development Engineering sample.

VI. DATA BASE MANAGERS (N=5). The members of this group are responsible for modifying data bases, accessing data bases, and ensuring data base integrity. The primary job emphasis for these personnel lay in the Data Base Management and Systems Development duties. These personnel were relatively senior, with an average of 148 months TAFMS. Representative tasks for this group include:

Develop data base update procedures
Design or modify data bases to meet new application needs
Determine methods of accesses to data bases
Ensure operational data base integrity
Coordinate with program element monitors
Analyze data base structures
Design data base special inquiry programs
Develop data base conversion plans

These personnel accounted for less than 1 percent of the Scientific and Development Engineering sample.

Summary of Jobs

Three software-related clusters and three jobs were identified within the Scientific and Development Engineer Career Area. Two clusters, the Program and Project Management Cluster and the Systems Development Cluster, accounted for 51 percent of the sample. Other jobs, such as the Data Base Analysts and the Contracting Officers were accounted for by very small numbers of personnel. As seen by the job descriptions of each job in Appendix A, many of these jobs are readily identifiable as being software related. Personnel in other jobs, however, may spend a small amount of time performing those tasks for software. Time spent on software-related duties by personnel in each cluster or job is given in Table 8.

COMMUNICATIONS-COMPUTER SYSTEMS
SOFTWARE MANAGEMENT, ACQUISITION, AND DEVELOPMENT JOBS
(AFSC 49XX)

I. SOFTWARE MANAGER CLUSTER (N=217)

- A. Software Maintenance Directors (N=14)
- B. Software Quality Assurance Officers (N=70)
- C. Configuration Management Personnel (N=24)

II. SOFTWARE DEVELOPMENT CLUSTER (N=859)

- A. Applications Programmers (N=684)
- B. Systems Software Analysts (N=24)
- C. Customer Support Personnel (N=18)

III. CONTRACTING OFFICER CLUSTER (N=164)

- A. Contract Coordinators (34)
- B. Request for Proposal Contract Officers (N=27)
- C. Contractor Assessment Officers (N=11)

IV. PROGRAM AND PROJECT MANAGERS (N=276)

V. ACQUISITION PROGRAM MANAGERS (N=319)

VI. TESTING OFFICERS (N=167)

Group Descriptions

The following paragraphs briefly describe the different clusters and jobs identified in the analysis of the Communications-Computer utilization field. For a more detailed listing of representative tasks and a summary of background data on these jobs, see Appendix B.

I. SOFTWARE MANAGER CLUSTER (N=217). These 217 officers held job titles such as Chief of Software Support/Development or Chief of Quality Assurance and were responsible for managing software and overseeing the development of software. These personnel performed tasks primarily from three main duties: Configuration Management and Quality Assurance, Systems Development, and Program and Project Management. Fifty-six percent of these officers were 492X personnel, while 32 percent were 491X personnel. Average TAFMS for this group was 133 months. Typical tasks performed by Software Managers are listed below.

Evaluate computer software test plan
Evaluate computer software requirements documentation
Evaluate computer software system specifications
Participate in design analyses, project team meetings, or internal design review meetings
Analyze user requirements in conceptualizing or defining software/hardware requirements
Conduct or participate in system reviews

The personnel in this cluster accounted for 7 percent of the Communications-Computer sample. Within this cluster, three jobs were identified. Software Maintenance Directors (N=14) was the first job identified. These officers were the most senior in the cluster with an average TAFMS of 169 months. These respondents evaluated requests for emergency software service and directed software maintenance on Communications-Computer systems. The next job identified was the Software Quality Assurance Officers (N=70). These respondents ensured systems or software conformed to technical requirements. The last job identified was the Configuration Management Personnel (N=24). These officers were responsible for the integration of various system components.

II. SOFTWARE DEVELOPMENT CLUSTER (N=859). The members of this cluster were responsible for developing and maintaining software. Of these 859 respondents, a large majority (84 percent), were 492X officers. Primary job emphasis for these officers lay in the Systems Development area. Average TAFMS for this group was 91 months. Tasks representative of this cluster appear below.

Write or modify computer source code
Compile or assemble computer programs
Test and debug program modules
Assist users in resolving computer software malfunctions
Maintain computer files, such as data or program files
Analyze computer applications software for modifications

This was the largest cluster in the 49XX sample and accounted for 29 percent of the 49XX respondents. Within this cluster, three jobs were identified. Applications Programmers (N=684) was the core group within the cluster and accounted for 80 percent of the cluster members. Job emphasis and tasks performed by this group closely approximates the cluster in that these personnel perform many Systems Development tasks to develop and maintain software. Systems Software Analysts (N=24) was the next job identified. These officers analyzed software, isolated software problems, and resolved or corrected software problems. The last job identified was the Customer Support Personnel (N=18). These officers also isolated and resolved software problems, however, these personnel worked primarily on small computers.

III. CONTRACTING OFFICER CLUSTER (N=164). These officers dealt with all aspects concerning contracts. Monitoring contracts, evaluating contracts, and coordinating contract specifications are examples of the duties contracting officers performed. Thirty-nine percent of these personnel held a 494X AFSC, and 33 percent of these officers held a 491X AFSC. Average TAFMS for this group was 122 months. Typical tasks performed by Contracting Officers are:

Provide technical expertise during contract negotiations
Coordinate with legal personnel or contracting officers on technical aspects of contracting, bids, or proposals
Evaluate contractor compliance with contract terms
Evaluate SOW or specifications for solicitations
Coordinate modifications to contracts
Draft or write inputs to RFP items, such as CDRL, SOW, DID, CLIN, or PWS

This cluster accounted for 6 percent of the survey sample. Within this cluster three jobs were identified. The first job identified was the Contract Coordinators (N=34). This group was more focused on performing contracting functions than the cluster as a whole. Functions performed include coordinating with vendors, contracting personnel, customers, or contractors on such

things as equipment repairs, contract specifications, or contract modifications. Request for Proposal Contract Officers (N=27) was the next job identified. These personnel performed the spectrum of contracting functions, but their primary job emphasis was dealing with Request For Proposals. These officers were very junior, with 76 months average TAFMS. Contractor Assessment Officers (N=11) was the last job identified. These personnel were responsible for assessing the performance of contractors and evaluating their compliance with contract terms.

IV. PROGRAM AND PROJECT MANAGERS (N=276). These officers had an extremely focused job concentrating entirely on Program and Project Management functions. Common job titles for these 276 officers were Program Manager or Branch Chief. Forty-five percent of these personnel were 494X officers, while 37 percent of these personnel were 491X officers. Fourteen percent of these officers held an H (Acquisition) prefix. Average TAFMS for this group was 148 months. Representative tasks performed by these personnel appear below:

Coordinate with supporting activities on their ability to support systems, subsystems, facilities, or equipment
Conduct program management meetings or working groups
Brief at program management reviews
Defend program or project schedules
Maintain or update program or project folders
Participate in technical meetings, such as interoperability meetings on program or project reviews
Coordinate with program element monitors

The personnel in this job accounted for 9 percent of the 49XX sample. Within this job, two variations existed. The first variation consisted of personnel who performed general level Program and Project Management tasks, such as conducting program management meetings or reviews, coordinating with program element monitors, and defending program schedules. The second variation consisted of officers who performed more technically oriented Program and Project Management tasks, such as conducting configuration management control boards and evaluating implementation support plans or engineering change proposals.

V. ACQUISITION PROGRAM MANAGERS (N=319). These personnel were similar to the Program and Project Managers in that they concentrate on the management of programs. Acquisition Program Managers also perform many acquisition and contracting related tasks in their jobs. Common job titles for these officers were Program Manager and Acquisition Manager. Thirty-one percent of these personnel were 494X officers, while 32 percent of these personnel were 491X officers. Average TAFMS for these respondents was 141 months. Typical tasks performed by Acquisition Program Managers are shown below.

Estimate impact on programs or projects due to delays
Coordinate with civilian companies on Communications-Computer systems matters
Coordinate with contracting officers on contract specifications
Evaluate effect of funding cuts on programs or projects
Evaluate contractor compliance with contract terms
Prepare statements of work

The personnel in this job accounted for 11 percent of the Communications-Computer sample.

VI. TESTING OFFICERS (N=167). These 167 personnel performed systems tests and evaluated the results of those tests. Expectedly, these officers had a distinct concentration on the performance of Testing and Evaluation tasks, with a slight accent on the performance of Program and Project Management and Systems Development duties. Common job titles for these respondents were Testing Manager and Evaluation Officer. Thirty-nine percent of these personnel held a 493X AFSC, while 23 percent of these personnel held a 492X AFSC. Average TAFMS for the personnel in this job was 110 months. Representative tasks for these personnel appear below.

Conduct or participate in operational tests or evaluations
Prepare test reports
Analyze system performance characteristics
Coordinate with appropriate agencies or personnel on test results or procedures
Develop test and diagnostic plans
Perform test data analyses

The respondents in this job accounted for 6 percent of the 49XX sample.

Summary of Jobs

Three software-related clusters and three jobs were identified within the Communications-Computer Utilization Field. The largest cluster identified was the Software Development Cluster, followed by the Acquisition Program Managers and the Program and Project Managers jobs. Overall, jobs were identified which clearly dealt with management of software, development of software, or acquisition of software.

Comparison of Scientific and Development Engineering Software Related Jobs and Communications-Computer Software-Related Jobs

An examination of the tasks performed by each job identified in both the Scientific and Development Engineering sample and the Communications-Computer sample shows several jobs between the two samples which are closely related. Both samples had Program and Project Managers. Both samples also had a job dealing with contracting and with Request For Proposals. Also, both samples had clusters dealing with software development, as well as an Applications Programmer job. As for the jobs in one sample which did not match closely to jobs in the other sample, the functions performed by those jobs were still performed, but only as part of another job. Overall, the Scientific and Development Engineering jobs tended to be narrower in focus than the Communications-Computer jobs.

ANALYSIS OF DAFSC GROUPS

An analysis of DAFSC groups is accomplished to determine differences in specific background data, duties, or tasks performed.

Scientific and Development Engineering AFSCs

Computer Research Scientist - AFSC 262X. Twenty-one Computer Research Scientists, who spend over 10 percent of their time on software-related duties, responded to our survey. These officers had a high emphasis on Systems Development tasks, with Program and Project Management and Acquisition and Contracting tasks receiving emphasis also. Common Systems Development tasks performed by this group included analyzing user requirements in conceptualizing or defining software/hardware requirements, and assisting users in resolving computer software malfunctions or problems. Forty-three percent of this group indicated they write or modify computer source code. Table 9 shows tasks representative of 262X officers. Overall, 72 percent of these personnel indicated they spend over one-half of their time on software-related duties. Table 10 shows the distribution of time spent on software-related duties for Computer Research Scientists. Common undergraduate degrees for these personnel included computer engineering, computer science, and electrical engineering.

Scientific Analyst - AFSC 268X. The survey sample included 90 respondents with a duty AFSC of 268X. A review of the computer-generated job description for this specialty reveals Scientific Analysts placed a high emphasis on Systems Development tasks. Data Base Management and Program and Project Management tasks were also commonly performed. Representative tasks performed by 268X personnel appear in Table 11. Fifty-six percent of this group said they write or modify computer source code. Thirty-four percent of these officers spend over one-half of their time working on software-related duties. Table 10 shows the distribution of time spent on software-related duties for these officers. The most common undergraduate major for Scientific Analysts was mathematics.

TABLE 9

REPRESENTATIVE TASKS PERFORMED BY DAFSC 262X PERSONNEL

TASKS	PERCENT MEMBERS PERFORMING (N=21)
ANALYZE USER REQUIREMENTS IN CONCEPTUALIZING OR DEFINING SOFTWARE/HARDWARE REQUIREMENTS	71
OBSERVE CONTRACTOR DEMONSTRATIONS	62
ASSIST USERS IN RESOLVING COMPUTER SOFTWARE MALFUNCTIONS OR PROBLEMS	48
WRITE OR MODIFY COMPUTER SOURCE CODE	43
TEST AND DEBUG PROGRAM MODULES	43
PARTICIPATE IN TECHNICAL MEETINGS, SUCH AS INTEROPERABILITY MEETINGS ON PROGRAM OR PROJECT REVIEWS	43
COMPILE OR ASSEMBLE COMPUTER PROGRAMS	43
REVIEW CONTRACTOR PROGRESS REPORTS	38
PARTICIPATE IN TECHNICAL INTERCHANGE MEETINGS (TIM)	38
CONDUCT PROGRAM MANAGEMENT MEETINGS OR WORKING GROUPS	38

TABLE 10

PERCENT TIME SPENT ON SOFTWARE MANAGEMENT, DEVELOPMENT, AND ACQUISITION DUTIES FOR DAFSC 26XX AND C-PREFIX PERSONNEL

	DAFSC			
PERCENT TIME SPENT	261X	262X	268X	C-PREFIX
0-10%	*	*	*	*
11-20%	25	5	31	20
21-30%	40	14	13	8
31-40%	5	0	18	16
41-50%	5	10	6	13
51-60%	10	10	3	12
61-70%	15	0	10	6
71-80%	5	19	8	6
81-90%	5	24	6	12
91-100%	0	19	7	6

* Personnel spending less than 10 percent of time on Software Management, Acquisition, and Development duties were removed
** Columns may not total 100 percent due to rounding or nonresponse

TABLE 11

REPRESENTATIVE TASKS PERFORMED BY DAFSC 268X PERSONNEL

TASKS	PERCENT MEMBERS PERFORMING (N=90)
ANALYZE COMPUTER APPLICATIONS SOFTWARE FOR MODIFICATIONS	59
WRITE OR MODIFY COMPUTER SOURCE CODE	56
MAINTAIN COMPUTER FILES, SUCH AS DATA OR PROGRAM FILES	56
COMPILE OR ASSEMBLE COMPUTER PROGRAMS	56
ASSIST USERS IN RESOLVING COMPUTER SOFTWARE MALFUNCTIONS OR PROBLEMS	56
ANALYZE USER REQUIREMENTS IN CONCEPTUALIZING OR DEFINING SOFTWARE/HARDWARE REQUIREMENTS	52
ALLOCATE COMPUTER FILES, SUCH AS DATA OR PROGRAM FILES	49
TEST AND DEBUG PROGRAM MODULES	47
DESIGN COMPUTER APPLICATIONS SOFTWARE TO FULFILL USER REQUIREMENTS	44
DETERMINE CAUSE OF APPLICATIONS SYSTEM SOFTWARE MALFUNCTIONS	42

Scientific Manager - AFSC 261X. This senior group of scientific personnel consisted of 20 individuals. Program and Project Management tasks were the most commonly performed, followed by Systems Development tasks and Acquisition and Contracting tasks. As Table 12 shows, Program and Project Management tasks were clearly emphasized, however, 35 percent of these officers indicated they write or modify computer source code. The shift in tasks performed (from Systems Development to Program and Project Management) indicated this group had more of a software management orientation than the 262X and 268X AFSCs, which had more of a software development orientation. Table 10 shows 35 percent of these officers spend over one-half of their time performing software-related duties.

Acquisition Project Officer - AFSC 272X. As Table 13 shows, the 124 Acquisition Project Officers in this study had a clear emphasis on Program and Project Management tasks. Also highly performed by these personnel were Acquisition and Contracting tasks. Table 14 shows the amount of time these tasks performed by 272X officers were applied to software-related duties. Engineering or electrical engineering were common undergraduate majors for these personnel.

Computer Systems Acquisition Manager - AFSC 273X. These eight officers placed approximately equal emphasis on Program and Project Management tasks and Systems Development tasks. Evaluating program documents, preparing statements of work, evaluating computer language applicability, and reviewing life cycle documentation were all common tasks performed by this group in the acquisition of computer systems. Table 15 shows representative tasks performed by these personnel, while Table 14 shows the distribution of time spent performing software-related duties. The educational background of these officers centered around computer science/technology or electrical engineering.

Acquisition Management Officer - AFSC 271X. While 271X officers performed very similar functions as 272X personnel, the Acquisition Management Officers were a little more focused on performing Program and Project Management tasks and Acquisition and Contracting tasks, and performed less Systems Development functions. Table 16 shows the representative tasks performed by these personnel, and Table 14 shows the distribution of time spent on software management, acquisition, and development functions. The academic background of these personnel centered around business or engineering.

Electronic Engineer - AFSC 282X. The 300 Electronic Engineers in our sample performed mainly Systems Development tasks, such as analyzing user requirements in conceptualizing or defining software/hardware requirements or compiling computer programs. Also commonly performed were Program and Project Management tasks, such as observing contractor demonstrations, and preparing statements of work; and Testing and Evaluation tasks, such as evaluating test reports or functional requirements specifications. Representative tasks for these respondents are listed in Table 17. Twenty-nine percent of these

TABLE 12

REPRESENTATIVE TASKS PERFORMED BY DAFSC 261X PERSONNEL

TASKS	PERCENT MEMBERS PERFORMING (N=20)
REQUEST ADDITIONAL FUNDING FOR PROGRAMS OR PROJECTS	55
CONDUCT PROGRAM MANAGEMENT MEETINGS OR WORKING GROUPS	55
BRIEF AT PROGRAM MANAGEMENT REVIEWS	50
PARTICIPATE IN DESIGN ANALYSES, PROJECT TEAM MEETINGS, OR INTERNAL DESIGN REVIEW MEETINGS	50
EVALUATE EFFECT OF FUNDING CUTS ON PROGRAMS OR PROJECTS	45
DEFEND PROGRAM OR PROJECT SCHEDULES OR MILESTONES	45
ESTABLISH TECHNICAL WORKING GROUPS	45
ANALYZE SYSTEM PERFORMANCE CHARACTERISTICS	45
ANALYZE COMPUTER APPLICATIONS SOFTWARE FOR MODIFICATIONS	45
COMPILE OR ASSEMBLE COMPUTER PROGRAMS	45

TABLE 13

REPRESENTATIVE TASKS PERFORMED BY DAFSC 272X PERSONNEL

TASKS	PERCENT MEMBERS PERFORMING (N=124)
ESTIMATE IMPACT ON PROGRAMS OR PROJECTS DUE TO DELAYS	72
CONDUCT PROGRAM MANAGEMENT MEETINGS OR WORKING GROUPS	71
COORDINATE WITH CIVILIAN COMPANIES ON SYSTEMS MATTERS	69
DEFEND PROGRAM OR PROJECT SCHEDULES OR MILESTONES	64
BRIEF AT PROGRAM MANAGEMENT REVIEWS	60
PARTICIPATE IN TECHNICAL INTERCHANGE MEETINGS (TIM)	59
COORDINATE WITH SUPPORTING ACTIVITIES ON THEIR ABILITY TO SUPPORT SYSTEMS, SUBSYSTEMS, FACILITIES, OR EQUIPMENT	56
EVALUATE EFFECT OF FUNDING CUTS ON PROGRAMS OR PROJECTS	56
OBSERVE CONTRACTOR DEMONSTRATIONS	52
EVALUATE PROGRAM DOCUMENTS, SUCH AS PROGRAM MANAGEMENT DIRECTIVES (PMD) OR PROGRAM MANAGEMENT PLANS (PMP)	51

TABLE 14

PERCENT TIME SPENT ON SOFTWARE MANAGEMENT, DEVELOPMENT, AND ACQUISITION DUTIES FOR DAFSC 27XX PERSONNEL

	DAFSC		
PERCENT TIME SPENT	271X	272X	273X
0-10%	*	*	*
11-20%	34	26	13
21-30%	22	19	0
31-40%	10	9	0
41-50%	2	10	0
51-60%	9	4	13
61-70%	6	7	13
71-80%	3	10	13
81-90%	7	9	0
91-100%	7	6	50

* Personnel spending less than 10 percent of time on Software Management, Acquisition, and Development duties were removed
** Columns may not total 100 percent due to rounding or nonresponse

TABLE 15

REPRESENTATIVE TASKS PERFORMED BY DAFSC 273X PERSONNEL

TASKS	PERCENT MEMBERS PERFORMING (N=8)
EVALUATE PROGRAM DOCUMENTS, SUCH AS PROGRAM MANAGEMENT DIRECTIVES (PMD) OR PROGRAM MANAGEMENT PLANS (PMP)	63
EVALUATE COMPUTER LANGUAGE APPLICABILITY	50
PARTICIPATE IN TECHNICAL USER GROUPS	50
DETERMINE APPLICABILITY OF MILITARY STANDARDS TO SYSTEMS, EQUIPMENT, OR SPECIFICATIONS	50
REVIEW LIFE CYCLE DOCUMENTATION	50
PARTICIPATE IN PROPOSAL REVIEWS OR MURDER BOARDS	50
PREPARE STATEMENTS OF WORK (SOW) FOR PROGRAMS OR PROJECTS	50
REVIEW DATA ITEM DESCRIPTIONS (DID)	50
ESTABLISH TECHNICAL WORKING GROUPS	50
OBSERVE CONTRACTOR DEMONSTRATIONS	38
ALLOCATE COMPUTER FILES, SUCH AS DATA OR PROGRAM FILES	38

TABLE 16

REPRESENTATIVE TASKS PERFORMED BY DAFSC 271X PERSONNEL

TASKS	PERCENT MEMBERS PERFORMING (N=86)
CONDUCT PROGRAM MANAGEMENT MEETINGS OR WORKING GROUPS	80
COORDINATE WITH CIVILIAN COMPANIES ON SYSTEMS MATTERS	79
EVALUATE PROGRAM DOCUMENTS, SUCH AS PROGRAM MANAGEMENT DIRECTIVE (PMD) OR PROGRAM MANAGEMENT PLANS (PMP)	74
DEFEND PROGRAM OR PROJECT SCHEDULES OR MILESTONES	73
COORDINATE WITH PROGRAM ELEMENT MONITORS	73
BRIEF AT PROGRAM MANAGEMENT REVIEWS	73
EVALUATE EFFECT OF FUNDING CUTS ON PROGRAMS OR PROJECTS	72
ESTIMATE IMPACT ON PROGRAMS OR PROJECTS DUE TO DELAYS	70
PARTICIPATE IN TECHNICAL MEETINGS, SUCH AS INTEROPERABILITY MEETINGS ON PROGRAM OR PROJECT REVIEWS	63
COORDINATE WITH SUPPORTING ACTIVITIES ON THEIR ABILITY TO SUPPORT SYSTEMS, SUBSYSTEMS, FACILITIES, OR EQUIPMENT	60

TABLE 17

REPRESENTATIVE TASKS PERFORMED BY DAFSC 282X PERSONNEL

TASKS	PERCENT MEMBERS PERFORMING (N=300)
PARTICIPATE IN TECHNICAL INTERCHANGE MEETINGS (TIM)	51
OBSERVE CONTRACTOR DEMONSTRATIONS	46
ANALYZE USER REQUIREMENTS IN CONCEPTUALIZING OR DEFINING SOFTWARE/HARDWARE REQUIREMENTS	45
COORDINATE WITH CIVILIAN COMPANIES ON SYSTEMS MATTERS	44
CONDUCT OR PARTICIPATE IN OPERATIONAL TESTS OR EVALUATIONS	42
BRIEF AT PROGRAM MANAGEMENT REVIEWS	40
ANALYZE SYSTEM PERFORMANCE CHARACTERISTICS	40
PARTICIPATE IN DESIGN ANALYSES, PROJECT TEAM MEETINGS, OR INTERNAL DESIGN REVIEW MEETINGS	40
PREPARE STATEMENTS OF WORK (SOW) FOR PROGRAMS OR PROJECTS	39
COMPILE OR ASSEMBLE COMPUTER PROGRAMS	38

personnel write or modify computer source code. Time spent on software management, acquisition, and development tasks is displayed in Table 18. Expectedly, 96 percent of these personnel held undergraduate majors in electrical engineering.

Astronautical Engineer - AFSC 284X. The software-related tasks performed by these 87 engineers were very similar to the Electronic Engineers in that their duties performed were mainly Systems Development tasks, followed by Program and Project Management tasks and then Testing and Evaluation tasks. Common tasks performed by Astronautical Engineers are displayed in Table 19. As shown in Table 18, 38 percent of these officers spend over one-half of their time performing software-related duties. Ninety-four percent of these personnel reported engineering as their undergraduate major.

Computer Systems Engineer - AFSC 288X. These 87 officers had their job emphasis on Systems Development duties. Also emphasized were Program and Project Management duties and Configuration Management and Quality Assurance duties. The tasks listed in Table 20 clearly show the level of software involvement of 288X officers. Table 18 shows the percent time distribution for these officers. Computer engineering or electrical engineering were the most common undergraduate majors for these personnel.

Staff Development Engineering Manager - AFSC 281X. A noticeable shift away from Systems Development duties and toward Program and Project Management duties was evident for these 92 engineering managers. Tasks such as defending program schedules, estimating the impact on projects due to delays, and evaluating effects of funding cuts on programs were commonly performed by this group. Other representative tasks performed by this group are displayed in Table 21. Time spent on software related duties for this group is displayed in Table 18.

Functional Automated Applications Analyst - C Prefix. These 85 officers held a variety of AFSCs, but all held the C prefix. The knowledge from their duty AFSCs was necessary in their interaction with the automated system they work with. These personnel had a strong emphasis on Systems Development functions, as well as heavy involvement with Program and Project Management functions. Representative tasks performed by these personnel are presented in Table 22. Time spent on software-related duties for these personnel are shown in Table 10.

Communications-Computer Systems AFSCs

Communications-Computer Systems Programming and Analysis Officer - AFSC 492X. The 1,301 492X officers in our sample were heavily involved in Systems Development. Assisting users in resolving computer software malfunctions, compiling computer programs, or writing computer source code are examples of software-related tasks which were highly performed by these officers. These personnel have a slight emphasis on Program and Project Management and Config-

TABLE 18

PERCENT TIME SPENT ON SOFTWARE MANAGEMENT, DEVELOPMENT, AND ACQUISITION DUTIES FOR DAFSC 28XX PERSONNEL

	DAFSC			
PERCENT TIME SPENT	281X	282X	284X	288X
0-10%	*	*	*	*
11-20%	35	27	38	11
21-30%	26	19	22	5
31-40%	5	11	6	2
41-50%	8	6	3	14
51-60%	7	6	3	7
61-70%	4	7	0	4
71-80%	3	11	9	3
81-90%	2	8	3	2
91-100%	10	6	16	10

* Personnel spending less than 10 percent of time on Software Management, Acquisition, and Development duties were removed
** Columns may not total 100 percent due to rounding or nonresponse

TABLE 19

REPRESENTATIVE TASKS PERFORMED BY DAFSC 284X PERSONNEL

TASKS	PERCENT MEMBERS PERFORMING (N=32)
PARTICIPATE IN TECHNICAL INTERCHANGE MEETINGS (TIM)	53
COORDINATE WITH CIVILIAN COMPANIES ON SYSTEMS MATTERS	47
MAINTAIN COMPUTER FILES, SUCH AS DATA OR PROGRAM FILES	44
ANALYZE SYSTEM PERFORMANCE CHARACTERISTICS	44
REVIEW TEST REPORTS	44
CONDUCT PROGRAM MANAGEMENT MEETINGS OR WORKING GROUPS	44
ANALYZE USER REQUIREMENTS IN CONCEPTUALIZING OR DEFINING SOFTWARE/HARDWARE REQUIREMENTS	44
CONDUCT OR PARTICIPATE IN SYSTEM REVIEWS	41
REVIEW VERIFICATION TESTS AND VALIDATION TESTS	41
EVALUATE TEST REPORTS	41

TABLE 20

REPRESENTATIVE TASKS PERFORMED BY DAFSC 288X PERSONNEL

TASKS	PERCENT MEMBERS PERFORMING (N=87)
ANALYZE USER REQUIREMENTS IN CONCEPTUALIZING OR DEFINING SOFTWARE/HARDWARE REQUIREMENTS	72
PARTICIPATE IN TECHNICAL INTERCHANGE MEETINGS (TIM)	57
OBSERVE CONTRACTOR DEMONSTRATIONS	55
EVALUATE VENDOR-SUPPLIED DOCUMENTATION OR PRODUCTS	54
ASSIST USERS IN RESOLVING COMPUTER SOFTWARE MALFUNCTIONS OR PROBLEMS	51
CONDUCT OR PARTICIPATE IN SYSTEM REVIEWS	51
COORDINATE WITH CIVILIAN COMPANIES ON SYSTEMS MATTERS	49
EVALUATE COMPUTER SOFTWARE REQUIREMENTS DOCUMENTATION	48
EVALUATE COMPUTER SOFTWARE TEST PLAN	48
EVALUATE COMPUTER SOFTWARE SYSTEM SPECIFICATIONS	45

TABLE 21

REPRESENTATIVE TASKS PERFORMED BY DAFSC 281X PERSONNEL

TASKS	PERCENT MEMBERS PERFORMING (N=92)
PARTICIPATE IN TECHNICAL INTERCHANGE MEETINGS (TIM)	61
DEFEND PROGRAM OR PROJECT SCHEDULES OR MILESTONES	60
CONDUCT PROGRAM MANAGEMENT MEETINGS OR WORKING GROUPS	58
ESTIMATE IMPACT ON PROGRAMS OR PROJECTS DUE TO DELAYS	58
COORDINATE WITH CIVILIAN COMPANIES ON SYSTEMS MATTERS	57
EVALUATE EFFECT OF FUNDING CUTS ON PROGRAMS OR PROJECTS	55
BRIEF AT PROGRAM MANAGEMENT REVIEWS	55
OBSERVE CONTRACTOR DEMONSTRATIONS	53
EVALUATE PROGRAM DOCUMENTS, SUCH AS PROGRAM MANAGEMENT DIRECTIVES (PMD) OR PROGRAM MANAGEMENT PLANS (PMP)	50
ESTABLISH TECHNICAL WORKING GROUPS	50

TABLE 22

REPRESENTATIVE TASKS PERFORMED BY C-PREFIX PERSONNEL

TASKS	PERCENT MEMBERS PERFORMING (N=85)
ANALYZE USER REQUIREMENTS IN CONCEPTUALIZING OR DEFINING SOFTWARE/HARDWARE REQUIREMENTS	59
ASSIST USERS IN RESOLVING COMPUTER SOFTWARE MALFUNCTIONS OR PROBLEMS	59
PARTICIPATE IN DESIGN ANALYSES, PROJECT TEAM MEETINGS, OR INTERNAL DESIGN REVIEW MEETINGS	54
ANALYZE COMPUTER APPLICATIONS SOFTWARE FOR MODIFICATIONS	53
EVALUATE VENDOR SUPPLIED DOCUMENTATION OR PRODUCTS	47
ALLOCATE COMPUTER FILES, SUCH AS DATA OR PROGRAM FILES	45
MAINTAIN COMPUTER FILES, SUCH AS DATA OR PROGRAM FILES	44
CONDUCT OR PARTICIPATE IN OPERATIONAL TESTS OR EVALUATIONS	42
BRIEF AT PROGRAM MANAGEMENT REVIEWS	40
DESIGN COMPUTER APPLICATIONS SOFTWARE TO FULFILL USER REQUIREMENTS	40

uration Management and Quality Assurance duties, but as the tasks in Table 23 show, the principal accent of their job was software-development related. Seventy-one percent of these officers held undergraduate majors in computer technology, while 21 percent of these officers majored in business.

Communications-Computer Systems Engineer - AFSC 493X. Communications-Computer Systems Engineers' duties were weighted primarily towards Program and Project Management duties, with Testing and Evaluation functions also stressed. The tasks displayed in Table 24 reveals the program management and systems evaluation orientation of these officers. Eighty-three percent of these 282 officers majored in electrical engineering.

Communications-Computer Systems Officer - AFSC 494X. These 657 Communications-Computer Systems Officers had a strong job emphasis centering on Program and Project Management and Acquisition and Contracting duties. Coordinating with vendors, evaluating maintenance or operations concepts, and monitoring the progress of CSRDs were all frequently performed tasks by these officers. Typical tasks performed by these personnel are shown in Table 25. Mathematics, computer technology, or business were the most common undergraduate majors for these personnel.

Communications-Computer Systems Staff Officer - AFSC 491X. These 731 staff officers had their primary emphasis on Program and Project Management duties, and minor job emphasis on Acquisition and Contracting and Systems Development. Representative tasks performed by these personnel are displayed in Table 26. Mathematics, computer technology, and business were the most common academic majors for these personnel.

Summary of DAFSC Analysis

A typical pattern of progression is present across DAFSCs within utilization fields as senior personnel indicated increased emphasis on duties involving management of software. This progression is evident through the shift in emphasis by the staff AFSCs to Program and Project Management, and Acquisition and Contracting duties, and away from the Systems Development area. Within the Scientific and Development Engineering sample, the 262X, 268X, 282X, 284X, 288X, and C prefix personnel seemed more concerned with software development functions while the 261X, 272X, 273X, 271X, and 281X personnel were more concerned with management and acquisition duties. D Prefix personnel were not presented due to the low number of personnel sampled. Within the Communications-Computer sample, the 492X personnel were heavily involved with software development while the 491X and 494X personnel were more concerned with management and acquisition duties. 493X personnel appeared to concentrate more on testing and evaluation functions. Table 27 shows the amount of time spent on software-related duties by civilian occupational series. As shown, several occupational series were heavily involved with software, with a majority of personnel in the 0334, 0855, 1520, and 1550 occupational series spending over 50 percent of their time on software-related duties.

TABLE 23

REPRESENTATIVE TASKS PERFORMED BY DAFSC 492X PERSONNEL

TASKS	PERCENT MEMBERS PERFORMING (N=1,301)
ASSIST USERS IN RESOLVING COMPUTER SOFTWARE MALFUNCTIONS OR PROBLEMS	60
ANALYZE USER REQUIREMENTS IN CONCEPTUALIZING OR DEFINING SOFTWARE/HARDWARE REQUIREMENTS	57
COMPILE OR ASSEMBLE COMPUTER PROGRAMS	57
ANALYZE COMPUTER APPLICATIONS SOFTWARE FOR MODIFICATIONS	57
WRITE OR MODIFY COMPUTER SOURCE CODE	51
DETERMINE CAUSE OF APPLICATIONS SYSTEM SOFTWARE MALFUNCTIONS	51
DESIGN COMPUTER APPLICATIONS SOFTWARE TO FULFILL USER REQUIREMENTS	49
TEST AND DEBUG PROGRAM MODULES	48
MAINTAIN COMPUTER FILES, SUCH AS DATA OR PROGRAM FILES	48
RESEARCH MANUALS, DOCUMENTATION, OR TECHNICAL PUBLICATIONS TO AID IN PROBLEM ISOLATION OR CORRECTION	43

TABLE 24

REPRESENTATIVE TASKS PERFORMED BY DAFSC 493X PERSONNEL

TASKS	PERCENT MEMBERS PERFORMING (N=282)
PARTICIPATE IN TECHNICAL MEETINGS, SUCH AS INTEROPERABILITY MEETINGS ON PROGRAM OR PROJECT REVIEWS	39
CONDUCT OR PARTICIPATE IN OPERATIONAL TESTS OR EVALUATIONS	39
ANALYZE SYSTEM PERFORMANCE CHARACTERISTICS	39
OBSERVE CONTRACTOR DEMONSTRATIONS	36
MAINTAIN OR UPDATE PROGRAM OR PROJECT FOLDERS	34
BRIEF AT PROGRAM MANAGEMENT REVIEWS	33
COORDINATE WITH APPROPRIATE AGENCIES OR PERSONNEL ON TEST RESULTS OR PROCEDURES	31
ATTEND PROGRAM DEVELOPMENT CONFERENCES THROUGHOUT THE ACQUISITION PROCESS	30
DETERMINE LOCATIONS FOR SYSTEMS, SUBSYSTEMS, FACILITIES, OR EQUIPMENT	30
PREPARE TEST REPORTS	29

TABLE 25

REPRESENTATIVE TASKS PERFORMED BY DAFSC 494X PERSONNEL

TASKS	PERCENT MEMBERS PERFORMING (N=657)
MAINTAIN OR UPDATE PROGRAM OR PROJECT FOLDERS	42
BRIEF AT PROGRAM MANAGEMENT REVIEWS	40
COORDINATE WITH CIVILIAN COMPANIES ON COMMUNICATIONS-COMPUTER SYSTEMS MATTERS	40
COORDINATE WITH SUPPORTING ACTIVITIES ON THEIR ABILITY TO SUPPORT SYSTEMS, SUBSYSTEMS, FACILITIES, OR EQUIPMENT	40
PARTICIPATE IN TECHNICAL MEETINGS, SUCH AS INTEROPERABILITY MEETINGS ON PROGRAM OR PROJECT REVIEWS	36
OBSERVE CONTRACTOR DEMONSTRATIONS	36
CONDUCT PROGRAM MANAGEMENT MEETINGS OR WORKING GROUPS	35
MONITOR PROGRESS OF CSRD, SON, OR CHANGE PROPOSALS OR REQUESTS	34
ESTIMATE IMPACT ON PROGRAMS OR PROJECTS DUE TO DELAYS	33

TABLE 26

REPRESENTATIVE TASKS PERFORMED BY DAFSC 491X PERSONNEL

TASKS	PERCENT MEMBERS PERFORMING (N=731)
PARTICIPATE IN TECHNICAL MEETINGS, SUCH AS INTEROPERABILITY MEETINGS ON PROGRAM OR PROJECT REVIEWS	40
OBSERVE CONTRACTOR DEMONSTRATIONS	39
BRIEF AT PROGRAM MANAGEMENT REVIEWS	39
DEFEND PROGRAM OR PROJECT SCHEDULES OR MILESTONES	37
COORDINATE WITH CIVILIAN COMPANIES ON COMMUNICATIONS-COMPUTER SYSTEMS MATTERS	37
CONDUCT PROGRAM MANAGEMENT MEETINGS OR WORKING GROUPS	37
EVALUATE OPERATIONS OR MAINTENANCE CONCEPTS	35
COORDINATE WITH SUPPORTING ACTIVITIES ON THEIR ABILITY TO SUPPORT SYSTEMS, SUBSYSTEMS, FACILITIES, OR EQUIPMENT	35
ESTIMATE IMPACT ON PROGRAMS OR PROJECTS DUE TO DELAYS	32
EVALUATE PROGRAM DOCUMENTS, SUCH AS PROGRAM MANAGEMENT DIRECTIVES (PMD) OR PROGRAM MANAGEMENT PLANS (PMP)	32
ANALYZE USER REQUIREMENTS IN CONCEPTUALIZING OR DEFINING SOFTWARE/HARDWARE REQUIREMENTS	29

TABLE 27

PERCENT TIME SPENT PERFORMING SOFTWARE-RELATED DUTIES BY CIVILIAN OCCUPATIONAL SERIES

	OCC SERIES								
PERCENT TIME SPENT	0301 (N=1,417)	0334 (N=81)	0801 (N=6)	0855 (N=780)	0861 (N=16)	1310 (N=6)	1515 (N=6)	1520 (N=30)	1550 (N=22)
11-20	15	7	17	8	44	50	33	7	14
21-30	17	4	67	7	19	33	0	0	14
31-40	11	6	0	6	13	0	0	3	18
41-50	6	7	0	6	0	0	17	3	0
51-60	7	6	0	7	0	0	0	3	14
61-70	6	7	0	7	6	0	0	10	5
71-80	10	12	0	15	0	0	0	27	9
81-90	10	17	0	17	19	0	33	23	9
91-100	16	33	17	29	0	17	17	23	27

* Columns may not total 100 percent due to rounding or nonresponse

SUMMARY OF BACKGROUND INFORMATION

Of interest to Software Management Broad Area Review representatives was the response to several background questions. The first question concerned the career field plans of the military officers performing software-related duties. Career field plans for Scientific and Development Engineering officers and Communications-Computer officers are displayed in Table 28. As shown, a slightly higher percentage of Scientific and Development Engineering lieutenants than 49XX lieutenants planned to stay in their field until retirement, while a higher percentage of 49XX captains and majors planned to stay in their field until retirement. Also, a higher percentage of 49XX lieutenants planned to cross-train to another field. While slight differences existed on career plans by rank, a look at the sample totals shows only a higher percentage of 49XX personnel desiring to cross-train to another utilization field. The next background question dealt with the overall level of education of those military and civilian personnel dealing with software. Table 29 displays the level of education of the Scientific and Development Engineering and Communications-Computer personnel, while Table 30 shows the civilian level of education. As shown by Tables 29 and 30, slightly higher percentages of 49XX personnel had less than a master's degree, while a slightly higher percentage of Scientific and Development Engineering personnel had a master's degree or higher. Overall, the civilian personnel had a much lower level of education than the military respondents. The last background question dealt with the programming languages that were being used by the civilian and military respondents. Table 31 shows programming languages used by the military respondents, while Table 32 displays the programming languages used by civilian personnel. An examination of these tables shows similar programming languages being used by the Communications-Computer personnel, Scientific and Development Engineering personnel, and civilian personnel. Overall, Fortran was the most frequently used programming language.

IMPLICATIONS

As explained in the INTRODUCTION to this report, these surveys were requested by the Software Management Group of the Software Management Broad Area Review to assess whether Scientific and Development Engineering personnel were performing similar software-related functions as the Communications-Computer personnel and, if so, to assess what software-related functions were being performed. Similar jobs and clusters were identified in each military sample. Duty AFSC analysis identified DAFSCs involved with the development of software, management of software, and the acquisition of software. Civilian personnel were also performing software-related duties.

Based on the data presented in this report, it appears Scientific and Development Engineering personnel and Communications-Computer personnel are performing similar software-related functions. This finding, along with the data presented in this report, was briefed at the November 1989 meeting of the Software Management Broad Area Review at Scott AFB IL. The data presented at the Broad Area Review meeting and within this report should be reviewed further by Broad Area Review representatives.

TABLE 28

CAREER FIELD PLANS BY RANK

	LT		CAPT		MAJ	
	26,27,28 (N=325)	49XX (N=1,079)	26,27,28 (N=360)	49XX (N=1,366)	26,27,28 (N=170)	49XX (N=359)
STAY IN FIELD UNTIL RETIREMENT	29	22	51	57	71	81
CROSS-TRAIN TO ANOTHER FIELD	11	20	5	8	2	5
CAREER BROADEN BUT RETURN TO CURRENT FIELD	28	23	16	12	3	3
UNDECIDED	19	23	14	14	5	5
SEPARATE	13	11	11	6	0	1
CURRENTLY RATED SUPP OR CAREER BROADENING & WILL LEAVE FIELD	0	0	*	1	6	2
CURRENTLY RATED SUPP OR CAREER BROADENING & WILL LEAVE FIELD BUT HOPE TO RETURN	0	0	1	1	9	1
OTHER	1	1	3	2	4	3

* Indicates less than 1 percent
** Columns may not total 100 percent due to rounding or nonresponse

TABLE 28 (CONTINUED)

CAREER FIELD PLANS BY RANK

	LT COL		COL		TOTAL	
	26,27,28 (N=86)	49XX (N=165)	26,27,28 (N=16)	49XX (N=6)	26,27,28 (N=959)	49XX (N=2,975)
STAY IN FIELD UNTIL RETIREMENT	84	85	88	100	50	49
CROSS-TRAIN TO ANOTHER FIELD	3	1	0	0	6	12
CAREER BROADEN BUT RETURN TO CURRENT FIELD	1	2	0	0	16	14
UNDECIDED	0	4	0	0	13	15
SEPARATE	0	1	0	0	8	5
CURRENTLY RATED SUPP OR CAREER BROADENING & WILL LEAVE FIELD	2	1	0	0	1	1
CURRENTLY RATED SUPP OR CAREER BROADENING & WILL LEAVE FIELD BUT HOPE TO RETURN	8	2	0	0	3	1
OTHER	0	4	12	0	2	2

* Indicates less than 1 percent
** Columns may not total 100 percent due to rounding or nonresponse

TABLE 29

HIGHEST LEVEL OF COMPLETED EDUCATION

LEVEL OF COMPLETED EDUCATION	LT		CAPT		MAJ	
	26,27,28 PERS (N=325)	49XX PERS (N=1,079)	26,27,28 PERS (N=360)	49XX PERS (N=1,366)	26,27,28 PERS (N=170)	49XX PERS (N=359)
BACHELOR'S DEGREE	43	53	14	18	1	3
BACHELOR'S DEGREE PLUS (NO MASTER'S)	46	39	33	33	8	10
MASTER'S DEGREE	9	6	35	37	46	55
MASTER'S DEGREE PLUS NO OTHER DEGREE	2	2	13	8	25	22
MORE THAN ONE MASTER'S DEGREE	0	0	2	2	12	8
DOCTORAL LEVEL	*	0	2	0	8	2

* Indicates less than 1 percent
** Columns may not total 100 percent due to rounding or nonresponse

TABLE 29 (CONTINUED)

HIGHEST LEVEL OF COMPLETED EDUCATION

LEVEL OF COMPLETED EDUCATION	LT COL		COL		ALL PERS	
	26,27,28 PERS (N=86)	49XX PERS (N=165)	26,27,28 PERS (N=160)	49XX PERS (N=*)	26,27,28 PERS (N=959)	49XX PERS (N=2,975)
BACHELOR'S DEGREE	1	5	0	*	20	28
BACHELOR'S DEGREE PLUS (NO MASTER'S)	5	2	0	*	30	31
MASTER'S DEGREE	47	61	56	*	29	30
MASTER'S DEGREE PLUS, NO OTHER DEGREE	22	19	19	*	13	8
MORE THAN ONE MASTER'S DEGREE	15	8	19	*	5	3
DOCTORAL LEVEL	9	2	6	*	3	1

* Data not given due to low number of colonels sampled
** Columns may not total 100 percent due to rounding or nonresponse

TABLE 30

HIGHEST LEVEL OF COMPLETED EDUCATION
FOR CIVILIAN RESPONDENTS

LEVEL OF COMPLETED EDUCATION	PERCENT OF CIVILIANS
HIGH SCHOOL	9
ASSOCIATE'S DEGREE	6
BACHELOR'S DEGREE	32
BACHELOR'S DEGREE PLUS (NO MASTER'S)	32
MASTER'S DEGREE	9
MASTER'S DEGREE PLUS (NO OTHER DEGREE)	7
MORE THAN ONE MASTER'S DEGREE	2
DOCTORAL LEVEL	1
OTHER	3

* Columns may not total 100 percent due to rounding or nonresponse

TABLE 31

PROGRAMMING LANGUAGES USED BY
MILITARY RESPONDENTS

26XX, 27XX, 28XX PERSONNEL		49XX PERSONNEL	
LANGUAGE	PERCENT USING	LANGUAGE	PERCENT USING
FORTRAN	39	FORTRAN	15
BASIC	24	ASSEMBLY	13
C	20	BASIC	12
ADA	19	COBOL	10
ASSEMBLY	17	JCL	10
PASCAL	15	PASCAL	7
UNIX	14	JOVIAL	5
JOVIAL	7	PL1	4
LISP	4	ADA	4

TABLE 32

PROGRAMMING LANGUAGES USED BY
CIVILIAN RESPONDENTS

LANGUAGE	PERCENT USING
FORTRAN	36
ASSEMBLY	35
ATLAS	20
C	20
COBAL	18
ADA	16
JOVIAL	14
PASCAL	14

APPENDIX A

TABLE A1

SYSTEMS MANAGER CLUSTER

GROUP SIZE: 119
NUMBER OF 26XX PERSONNEL: 11
NUMBER OF 27XX PERSONNEL: 18
NUMBER OF 28XX PERSONNEL: 84

PERCENT OF SAMPLE: 12
AVERAGE TAFMS: 104 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
EVALUATE TEST REPORTS	75
PARTICIPATE IN TECHNICAL INTERCHANGE MEETINGS (TIM)	75
EVALUATE FUNCTIONAL REQUIREMENTS DOCUMENTS/SPECIFICATION	73
REVIEW VERIFICATION TESTS AND VALIDATION TESTS	65
CONDUCT OR PARTICIPATE IN OPERATIONAL TESTS OR EVALUATIONS	62
EVALUATE COMPUTER SOFTWARE TEST PLAN	61
COORDINATE WITH CIVILIAN COMPANIES ON SYSTEMS MATTERS	61
REVIEW FUNCTIONAL REQUIREMENTS SPECIFICATIONS	57
REVIEW REQUIREMENTS DOCUMENTS, SUCH AS SOFTWARE REQUESTS, SON, SOW, SORD, MEN, OR ROC	56
CONDUCT OR PARTICIPATE IN SYSTEM REVIEWS	56
EVALUATE COMPUTER SOFTWARE REQUIREMENTS DOCUMENTATION	55
EVALUATE ACCEPTANCE TESTS ON SYSTEMS, SUBSYSTEMS, FACILITIES, OR EQUIPMENT	55
MONITOR ACCEPTANCE TESTS ON SYSTEMS, SUBSYSTEMS, FACILITIES, OR EQUIPMENT	54
ANALYZE SYSTEM PERFORMANCE CHARACTERISTICS	50

TABLE A2

SYSTEMS SOFTWARE ENGINEERS

GROUP SIZE: 43
NUMBER OF 26XX PERSONNEL: 1
NUMBER OF 27XX PERSONNEL: 4
NUMBER OF 28XX PERSONNEL: 38

PERCENT OF SAMPLE: 4
AVERAGE TAFMS: 89 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
EVALUATE COMPUTER SOFTWARE REQUIREMENTS DOCUMENTATION	93
EVALUATE COMPUTER SOFTWARE SYSTEM SPECIFICATIONS	93
EVALUATE COMPUTER SOFTWARE TEST PLAN	91
EVALUATE COMPUTER SOFTWARE FUNCTIONAL DESCRIPTIONS	86
PARTICIPATE IN TECHNICAL INTERCHANGE MEETINGS (TIM)	86
ENSURE PROGRAMS OR DOCUMENTATION COMPLY WITH STANDARDS	79
EVALUATE ENGINEERING CHANGE PROPOSALS (ECP) OR REQUESTS (ECR)	79
EVALUATE FUNCTIONAL REQUIREMENTS DOCUMENTS/SPECIFICATIONS	76
RECOMMEND APPROVAL OR DISAPPROVAL FOR SOFTWARE PROGRAM SPECIFICATIONS	76
CONDUCT OR PARTICIPATE IN SYSTEM REVIEWS	74
REVIEW VERIFICATION TESTS AND VALIDATION TESTS	72
REVIEW TEST REPORTS	72
EVALUATE TEST REPORTS	72

TABLE A3

SOFTWARE ACQUISITION OFFICERS

GROUP SIZE: 6
NUMBER OF 26XX PERSONNEL: 0
NUMBER OF 27XX PERSONNEL: 2
NUMBER OF 28XX PERSONNEL: 4

PERCENT OF SAMPLE: Less than 1%
AVERAGE TAFMS: 141 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
PARTICIPATE IN TECHNICAL INTERCHANGE MEETINGS (TIM)	100
REVIEW REQUIREMENTS DOCUMENTS, SUCH AS SOFTWARE REQUESTS, SON, SOW, SORD, MEN, OR ROC	100
EVALUATE COMPUTER SOFTWARE REQUIREMENTS DOCUMENTATION	100
PARTICIPATE IN DESIGN ANALYSES, PROJECT TEAM MEETINGS, OR INTERNAL DESIGN REVIEW MEETINGS	100
EVALUATE COMPUTER SOFTWARE SYSTEM SPECIFICATIONS	100
DETERMINE NEED FOR SYSTEM ENGINEERING AND TECHNICAL ASSISTANCE (SETA) TASKS	83
COORDINATE WITH CONTRACTING OFFICERS ON CONTRACT SPECIFICATIONS	83
EVALUATE COMPUTER SOFTWARE FUNCTIONAL DESCRIPTIONS	83
RECOMMEND APPROVAL OR DISAPPROVAL FOR SOFTWARE PROGRAM SPECIFICATIONS	83
EVALUATE COMPUTER SOFTWARE TEST PLAN	83
RESPOND TO CONTRACTOR INQUIRIES ON CONTRACTING MATTERS	67
EVALUATE VENDOR-SUPPLIED DOCUMENTATION OR PRODUCTS	67
REVIEW CONTRACTOR PROGRESS REPORTS	67
DETERMINE SOFTWARE COST ESTIMATES FOR PROGRAMS AND PROJECTS	67

TABLE A4

SOFTWARE CONTRACT MONITORS

GROUP SIZE: 5
NUMBER OF 26XX PERSONNEL: 1
NUMBER OF 27XX PERSONNEL: 0
NUMBER OF 28XX PERSONNEL: 4

PERCENT OF SAMPLE: Less than 1%
AVERAGE TAFMS: 67 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
REVIEW CONTRACTOR PROGRESS REPORTS	100
COORDINATE WITH PROJECT OR PROGRAM MANAGER ON DOCUMENTATION OF SOFTWARE DEFICIENCIES	100
EVALUATE COMPUTER SOFTWARE REQUIREMENTS DOCUMENTATION	100
EVALUATE COMPUTER SOFTWARE FUNCTIONAL DESCRIPTIONS	100
EVALUATE COMPUTER SOFTWARE SYSTEM SPECIFICATIONS	100
REVIEW FUNCTIONAL REQUIREMENTS SPECIFICATIONS	100
PREPARE STATUS REPORTS ON COMPUTER SOFTWARE ACTIVITIES	80
REVIEW CONTRACTOR DISCREPANCY REPORTS	80
EVALUATE FUNCTIONAL REQUIREMENTS DOCUMENTS/SPECIFICATIONS	80
ENSURE SOFTWARE COMPLIES WITH RESOURCE ALLOCATIONS	80
PERFORM CONTRACTOR PERFORMANCE ASSESSMENTS	60
CONDUCT AUDITS IN SUPPORT OF CONTRACTOR PERFORMANCE EVALUATIONS	60
VERIFY CONTRACTOR PROVIDED SOLUTIONS TO COMPUTER SOFTWARE/ HARDWARE PROBLEMS OR MALFUNCTIONS	60
PERFORM TECHNICAL OR MANAGEMENT EVALUATIONS OF CONTRACT PROPOSALS	60

TABLE A5

SOFTWARE EVALUATORS

GROUP SIZE: 6
NUMBER OF 26XX PERSONNEL: 0
NUMBER OF 27XX PERSONNEL: 0
NUMBER OF 28XX PERSONNEL: 6

PERCENT OF SAMPLE: Less than 1%
AVERAGE TAFMS: 133 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
CONDUCT OR PARTICIPATE IN OPERATIONAL TESTS OR EVALUATIONS	100
ENSURE PROGRAMS OR DOCUMENTATION COMPLY WITH STANDARDS	100
EVALUATE COMPUTER SOFTWARE TEST PLAN	100
EVALUATE COMPUTER SOFTWARE SYSTEM SPECIFICATIONS	100
EVALUATE VENDOR SUPPLIED DOCUMENTATION OR PRODUCTS	83
EVALUATE COMPUTER SOFTWARE REQUIREMENTS DOCUMENTATION	83
ASSIST USERS IN RESOLVING COMPUTER SOFTWARE MALFUNCTIONS OR PROBLEMS	83
ANALYZE USER REQUIREMENTS IN CONCEPTUALIZING OR DEFINING SOFTWARE/HARDWARE REQUIREMENTS	83
REVIEW OR EVALUATE PROGRAM PRODUCTS, SUCH AS TEST PLANS, SPECIFICATIONS, OR MANUALS	67
COORDINATE WITH SUPPORTING ACTIVITIES ON THEIR ABILITY TO SUPPORT SYSTEMS, SUBSYSTEMS, FACILITIES, OR EQUIPMENT	67
EVALUATE COMPUTER SOFTWARE FUNCTIONAL DESCRIPTIONS	67
EVALUATE TEST REPORTS	67
COORDINATE WITH PROJECT OR PROGRAM MANAGER ON DOCUMENTATION OF SOFTWARE DEFICIENCIES	67

TABLE A6

TESTING PERSONNEL

GROUP SIZE: 37
NUMBER OF 26XX PERSONNEL: 0
NUMBER OF 27XX PERSONNEL: 8
NUMBER OF 28XX PERSONNEL: 20

PERCENT OF SAMPLE: 4
AVERAGE TAFMS: 121 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
CONDUCT OR PARTICIPATE IN OPERATIONAL TESTS OR EVALUATIONS	92
REVIEW TEST REPORTS	92
EVALUATE TEST REPORTS	92
ANALYZE SYSTEM PERFORMANCE CHARACTERISTICS	86
REVIEW VERIFICATION TESTS AND VALIDATION TESTS	83
COORDINATE WITH CIVILIAN COMPANIES ON SYSTEMS MATTERS	81
REVIEW REQUIREMENTS DOCUMENTS, SUCH AS SOFTWARE REQUESTS, SON, SOW, SORD, MEN, OR ROC	81
EVALUATE VERIFICATION TESTS AND VALIDATION TESTS	77
EVALUATE FUNCTIONAL REQUIREMENTS DOCUMENTS/SPECIFICATION	73
MONITOR ACCEPTANCE TESTS ON SYSTEMS, SUBSYSTEMS FACILITIES, OR EQUIPMENT	70
BRIEF AT PROGRAM MANAGEMENT REVIEWS	70
EVALUATE ACCEPTANCE TESTS ON SYSTEMS, SUBSYSTEMS, FACILITIES, OR EQUIPMENT	68
OBSERVE CONTRACTOR DEMONSTRATIONS	65
CONDUCT PROGRAM MANAGEMENT MEETINGS OR WORKING GROUPS	62
PARTICIPATE IN TECHNICAL INTERCHANGE MEETINGS (TIM)	62
CONSOLIDATE INPUTS TO SON, MEN, CSRD, OR ROC	59

TABLE A7

SYSTEMS EVALUATORS

GROUP SIZE: 5
NUMBER OF 26XX PERSONNEL: 2
NUMBER OF 27XX PERSONNEL: 0
NUMBER OF 28XX PERSONNEL: 1

PERCENT OF SAMPLE: Less than 1%
AVERAGE TAFMS: 140 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
EVALUATE SYSTEM SIMULATION STUDIES TO DETERMINE DEFICIENCIES IN DESIGN	100
REVIEW VERIFICATION TESTS AND VALIDATION TESTS	100
EVALUATE FUNCTIONAL REQUIREMENTS DOCUMENTS/SPECIFICATIONS	100
MAINTAIN COMPUTER FILES, SUCH AS DATA OR PROGRAM FILES	100
EVALUATE VERIFICATION TESTS AND VALIDATION TESTS	100
ANALYZE SYSTEM PERFORMANCE CHARACTERISTICS	80
REVIEW SYSTEM SIMULATION STUDIES TO DETERMINE DEFICIENCIES IN DESIGN	80
EVALUATE TEST REPORTS	80
REVIEW TEST REPORTS	80
REVIEW FUNCTIONAL REQUIREMENTS SPECIFICATIONS	80
CONDUCT OR PARTICIPATE IN OPERATIONAL TESTS OR EVALUATIONS	60
EVALUATE ACCEPTANCE TESTS ON SYSTEMS, SUBSYSTEMS, FACILITIES, OR EQUIPMENT	60
WRITE OR MODIFY COMPUTER SOURCE CODE	60

TABLE A8

PROBLEM SOLVERS

GROUP SIZE: 12
NUMBER OF 26XX PERSONNEL: 6
NUMBER OF 27XX PERSONNEL: 4
NUMBER OF 28XX PERSONNEL: 2

PERCENT OF SAMPLE: 1
AVERAGE TAFMS: 104 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
DETERMINE CAUSE OF APPLICATIONS SYSTEM SOFTWARE MALFUNCTIONS	100
ANALYZE USER REQUIREMENTS IN CONCEPTUALIZING OR DEFINING SOFTWARE/HARDWARE REQUIREMENTS	100
PARTICIPATE IN DESIGN ANALYSES, PROJECT TEAM MEETINGS, OR INTERNAL DESIGN REVIEW MEETINGS	92
CONDUCT OR PARTICIPATE IN OPERATIONAL TESTS OR EVALUATIONS	83
PARTICIPATE IN TECHNICAL INTERCHANGE MEETINGS (TIM)	83
DETERMINE CORRECTIVE ACTIONS TO COMPUTER SYSTEM DEFICIENCY, OR TROUBLE REPORTS	83
EVALUATE VERIFICATION TESTS AND VALIDATION TESTS	83
ASSIST USERS IN RESOLVING COMPUTER SOFTWARE MALFUNCTIONS OR PROBLEMS	83
RESEARCH MANUALS, DOCUMENTATION, OR TECHNICAL PUBLICATIONS TO AID IN PROBLEM ISOLATION OR CORRECTION	75
VERIFY CONTRACTOR-PROVIDED SOLUTIONS TO COMPUTER SOFTWARE/ HARDWARE PROBLEMS OR MALFUNCTIONS	75
EVALUATE TEST REPORTS	75
ANALYZE COMPUTER APPLICATIONS SOFTWARE FOR MODIFICATIONS	75
PROVIDE ASSISTANCE TO USERS ON NEW SYSTEM CHARACTERISTICS AND PERFORMANCE	67
DETERMINE CAUSE OF OPERATING SYSTEM SOFTWARE MALFUNCTIONS	58

TABLE A9

PROGRAM AND PROJECT MANAGEMENT CLUSTER

GROUP SIZE: 298
NUMBER OF 26XX PERSONNEL: 6
NUMBER OF 27XX PERSONNEL: 122
NUMBER OF 28XX PERSONNEL: 122

PERCENT OF SAMPLE: 31
AVERAGE TAFMS: 136 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
CONDUCT PROGRAM MANAGEMENT MEETINGS OR WORKING GROUPS	90
COORDINATE WITH CIVILIAN COMPANIES ON SYSTEMS MATTERS	86
ESTIMATE IMPACT ON PROGRAMS OR PROJECTS DUE TO DELAYS	86
BRIEF AT PROGRAM MANAGEMENT REVIEWS	86
DEFEND PROGRAM OR PROJECT SCHEDULES OR MILESTONES	85
EVALUATE EFFECT OF FUNDING CUTS ON PROGRAMS OR PROJECTS	81
OBSERVE CONTRACTOR DEMONSTRATIONS	76
PARTICIPATE IN TECHNICAL INTERCHANGE MEETINGS (TIM)	75
PARTICIPATE IN TECHNICAL MEETINGS, SUCH AS INTEROPERABILITY MEETINGS ON PROGRAM OR PROJECT REVIEWS	72
COORDINATE WITH SUPPORTING ACTIVITIES ON THEIR ABILITY TO SUPPORT SYSTEMS, SUBSYSTEMS, FACILITIES, OR EQUIPMENT	72
REQUEST ADDITIONAL FUNDING FOR PROGRAMS OR PROJECTS	70
EVALUATE PROGRAM DOCUMENTS, SUCH AS PROGRAM MANAGEMENT DIRECTIVES (PMD) OR PROGRAM MANAGEMENT PLANS (PMP)	67
CONDUCT OR PARTICIPATE IN SYSTEM REVIEWS	65

TABLE A10

PROGRAM MANAGERS

GROUP SIZE: 73
NUMBER OF 26XX PERSONNEL: 4
NUMBER OF 27XX PERSONNEL: 30
NUMBER OF 28XX PERSONNEL: 31

PERCENT OF SAMPLE: 8
AVERAGE TAFMS: 152 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
ESTIMATE IMPACT ON PROGRAMS OR PROJECTS DUE TO DELAYS	97
DEFEND PROGRAM OR PROJECT SCHEDULES OR MILESTONES	93
COORDINATE WITH CIVILIAN COMPANIES ON SYSTEMS MATTERS	89
CONDUCT PROGRAM MANAGEMENT MEETINGS OR WORKING GROUPS	86
BRIEF AT PROGRAM MANAGEMENT REVIEWS	85
EVALUATE PROGRAM DOCUMENTS, SUCH AS PROGRAM MANAGEMENT DIRECTIVES (PMD) OR PROGRAM MANAGEMENT PLANS (PMP)	85
EVALUATE EFFECT OF FUNDING CUTS ON PROGRAMS OR PROJECTS	82
COORDINATE WITH PROGRAM ELEMENT MONITORS	82
REPORT STATUS OF PROGRAM MANAGER MILESTONES	78
COORDINATE WITH SUPPORTING ACTIVITIES ON THEIR ABILITY TO SUPPORT SYSTEMS, SUBSYSTEMS, FACILITIES, OR EQUIPMENT	75
REQUEST ADDITIONAL FUNDING FOR PROGRAMS OR PROJECTS	74
PARTICIPATE IN TECHNICAL MEETINGS, SUCH AS INTEROPERABILITY MEETINGS ON PROGRAM OR PROJECT REVIEWS	64
OBSERVE CONTRACTOR DEMONSTRATIONS	59
RESOLVE PROGRAM OR PROJECT MILESTONE CONFLICTS	58
PARTICIPATE IN TECHNICAL INTERCHANGE MEETINGS (TIM)	58
PREPARE STATEMENTS OF WORK (SOW) FOR PROGRAMS OR PROJECTS	56

TABLE A11

PROGRAM AND CONTRACT MANAGERS

GROUP SIZE: 155
NUMBER OF 26XX PERSONNEL: 8
NUMBER OF 27XX PERSONNEL: 62
NUMBER OF 28XX PERSONNEL: 82

PERCENT OF SAMPLE: 16
AVERAGE TAFMS: 127 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
CONDUCT PROGRAM MANAGEMENT MEETINGS OR WORKING GROUPS	96
BRIEF AT PROGRAM MANAGEMENT REVIEWS	93
COORDINATE WITH CIVILIAN COMPANIES ON SYSTEMS MATTERS	92
ESTIMATE IMPACT ON PROGRAMS OR PROJECTS DUE TO DELAYS	88
EVALUATE EFFECT OF FUNDING CUTS ON PROGRAMS OR PROJECTS	88
DEFEND PROGRAM OR PROJECT SCHEDULES OR MILESTONES	87
CONDUCT OR PARTICIPATE IN SYSTEM REVIEWS	86
OBSERVE CONTRACTOR DEMONSTRATIONS	85
PARTICIPATE IN TECHNICAL INTERCHANGE MEETINGS (TIM)	83
COORDINATE WITH SUPPORTING ACTIVITIES ON THEIR ABILITY TO SUPPORT SYSTEMS, SUBSYSTEMS, FACILITIES, OR EQUIPMENT	82
PARTICIPATE IN TECHNICAL MEETINGS, SUCH AS INTEROPERABILITY MEETINGS ON PROGRAM OR PROJECT REVIEWS	81
REQUEST ADDITIONAL FUNDING FOR PROGRAMS OR PROJECTS	75
EVALUATE PROGRAM DOCUMENTS, SUCH AS PROGRAM MANAGEMENT DIRECTIVES (PMD) OR PROGRAM MANAGEMENT PLANS (PMP)	72
REPORT STATUS OF PROGRAM MANAGER MILESTONES	72
COORDINATE WITH CONTRACTING OFFICERS ON CONTRACT SPECIFICATIONS	72

TABLE A12

REQUEST FOR PROPOSAL CONTRACTING PERSONNEL

GROUP SIZE: 28
NUMBER OF 26XX PERSONNEL: 3
NUMBER OF 27XX PERSONNEL: 10
NUMBER OF 28XX PERSONNEL: 15

PERCENT OF SAMPLE: 3
AVERAGE TAFMS: 114 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
DRAFT OR WRITE INPUTS TO RFP ITEMS, SUCH AS CDRL, SOW, DID, CLIN, OR PWS	96
DEVELOP REQUEST FOR PROPOSAL (RFP)	89
CONDUCT PROGRAM MANAGEMENT MEETINGS OR WORKING GROUPS	82
COORDINATE MODIFICATIONS TO CONTRACTS	82
OBSERVE CONTRACTOR DEMONSTRATIONS	82
COORDINATE WITH CONTRACTING OFFICERS ON CONTRACT SPECIFICATIONS	79
EVALUATE SOW OR SPECIFICATIONS FOR SOLICITATIONS	79
CONSOLIDATE RFP ITEM INPUTS, SUCH AS CDRL, SOW, DID, CLIN, OR PWS INPUTS	79
BRIEF AT PROGRAM MANAGEMENT REVIEWS	79
EVALUATE CONTRACTOR COMPLIANCE WITH CONTRACT TERMS	75
PREPARE STATEMENTS OF WORK (SOW) FOR PROGRAMS OR PROJECTS	75
REVIEW CONTRACTOR PROGRESS REPORTS	75
DEFEND PROGRAM OR PROJECT SCHEDULES OR MILESTONES	75
COORDINATE WITH LEGAL PERSONNEL OR CONTRACTING OFFICERS ON TECHNICAL ASPECTS OF CONTRACTS, BIDS, OR PROPOSALS	75

TABLE A13

SYSTEMS DEVELOPMENT CLUSTER

GROUP SIZE: 245
NUMBER OF 26XX PERSONNEL: 64
NUMBER OF 27XX PERSONNEL: 12
NUMBER OF 28XX PERSONNEL: 127

PERCENT OF SAMPLE: 26
AVERAGE TAFMS: 99 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
COMPILE OR ASSEMBLE COMPUTER PROGRAMS	79
WRITE OR MODIFY COMPUTER SOURCE CODE	78
ANALYZE COMPUTER APPLICATIONS SOFTWARE FOR MODIFICATIONS	77
ASSIST USERS IN RESOLVING COMPUTER SOFTWARE MALFUNCTIONS OR PROBLEMS	72
MAINTAIN COMPUTER FILES, SUCH AS DATA OR PROGRAM FILES	70
DESIGN COMPUTER APPLICATIONS SOFTWARE TO FULFILL USER REQUIREMENTS	67
TEST AND DEBUG PROGRAM MODULES	66
ANALYZE USER REQUIREMENTS IN CONCEPTUALIZING OR DEFINING SOFTWARE/HARDWARE REQUIREMENTS	66
ALLOCATE COMPUTER FILES, SUCH AS DATA OR PROGRAM FILES	63
DETERMINE CAUSE OF APPLICATIONS SYSTEM SOFTWARE MALFUNCTIONS	60
LINK-EDIT PROGRAM MODULES	50
DRAFT, WRITE, OR UPDATE INTERNAL SOURCE PROGRAM DOCUMENTATION, SUCH AS COMMENTS OR NOTES	42
ANALYZE DATA BASE STRUCTURES	42
EVALUATE VENDOR SUPPLIED DOCUMENTATION OR PRODUCTS	42
ANALYZE COMPUTER HARDWARE SYSTEMS FOR MODIFICATIONS	41

TABLE A14

CUSTOMER SUPPORT PERSONNEL

GROUP SIZE: 20
NUMBER OF 26XX PERSONNEL: 5
NUMBER OF 27XX PERSONNEL: 2
NUMBER OF 28XX PERSONNEL: 9

PERCENT OF SAMPLE: 2
AVERAGE TAFMS: 128 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
ASSIST USERS IN RESOLVING COMPUTER SOFTWARE MALFUNCTIONS OR PROBLEMS	100
ANALYZE USER REQUIREMENTS IN CONCEPTUALIZING OR DEFINING SOFTWARE/HARDWARE REQUIREMENTS	95
EVALUATE VENDOR-SUPPLIED DOCUMENTATION OR PRODUCTS	95
PROVIDE ASSISTANCE TO USERS ON NEW SYSTEM CHARACTERISTICS AND PERFORMANCE	75
ANALYZE COMPUTER APPLICATIONS SOFTWARE FOR MODIFICATIONS	77
DETERMINE CAUSE OF APPLICATIONS SYSTEM SOFTWARE MALFUNCTIONS	65
ADMINISTER TAPE OR DISK MANAGEMENT PROCEDURES	60
ANALYZE COMPUTER HARDWARE SYSTEMS FOR MODIFICATIONS	60
MAINTAIN COMPUTER FILES, SUCH AS DATA OR PROGRAM FILES	55
DETERMINE CORRECTIVE ACTIONS TO COMPUTER SYSTEM INCIDENT, DEFICIENCY, OR TROUBLE REPORTS	50
PARTICIPATE IN TECHNICAL USER GROUPS	50
ADVISE USERS OF AVAILABLE DATA BASES	50
DRAFT, WRITE, OR UPDATE INPUTS TO PROGRAM MANUALS OR HANDBOOKS, SUCH AS USERS, OPERATIONS, OR MAINTENANCE MANUALS	45
CONSOLIDATE INPUTS TO SON, MEN, CSRD, OR ROC	45

TABLE A15

SYSTEMS DATA BASE DEVELOPMENT PERSONNEL

GROUP SIZE: 12
NUMBER OF 26XX PERSONNEL: 0
NUMBER OF 27XX PERSONNEL: 1
NUMBER OF 28XX PERSONNEL: 3

PERCENT OF SAMPLE: 1
AVERAGE TAFMS: 124 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
ASSIST USERS IN RESOLVING COMPUTER SOFTWARE MALFUNCTIONS OR PROBLEMS	100
ANALYZE COMPUTER APPLICATIONS SOFTWARE FOR MODIFICATIONS	100
ANALYZE USER REQUIREMENTS IN CONCEPTUALIZING OR DEFINING SOFTWARE/HARDWARE REQUIREMENTS	92
OBSERVE CONTRACTOR DEMONSTRATIONS	92
DESIGN COMPUTER APPLICATIONS SOFTWARE TO FULFILL USER REQUIREMENTS	83
DESIGN COMPUTER HARDWARE SYSTEMS TO FULFILL USER REQUIREMENTS	83
COORDINATE WITH CIVILIAN COMPANIES ON SYSTEMS MATTERS	83
ADVISE USERS OF AVAILABLE DATA BASES	83
ANALYZE DATA BASE STRUCTURES	83
EVALUATE FUNCTIONAL REQUIREMENTS DOCUMENTS/SPECIFICATIONS	75
PROVIDE ASSISTANCE TO USERS ON NEW SYSTEM CHARACTERISTICS AND PERFORMANCE	75
COORDINATE WITH PROGRAMMERS ON UPDATES OR CORRECTIONS TO DATA BASE SYSTEMS	75
ANALYZE USERS' DATA BASE FOR COMPATIBILITY WITH DBMS PACKAGES	75
ASCERTAIN TRANSPORTABILITY OF DATA BASES BETWEEN ADP SYSTEMS	67

TABLE A16

APPLICATIONS PROGRAMMERS

GROUP SIZE: 143
NUMBER OF 26XX PERSONNEL: 43
NUMBER OF 27XX PERSONNEL: 2
NUMBER OF 28XX PERSONNEL: 84

PERCENT OF SAMPLE: 15
AVERAGE TAFMS: 88 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
WRITE OR MODIFY COMPUTER SOURCE CODE	99
COMPILE OR ASSEMBLE COMPUTER PROGRAMS	92
TEST AND DEBUG PROGRAM MODULES	84
ANALYZE COMPUTER APPLICATIONS SOFTWARE FOR MODIFICATIONS	76
DESIGN COMPUTER APPLICATIONS SOFTWARE TO FULFILL USER REQUIREMENTS	75
MAINTAIN COMPUTER FILES, SUCH AS DATA OR PROGRAM FILES	68
ASSIST USERS IN RESOLVING COMPUTER SOFTWARE MALFUNCTIONS OR PROBLEMS	64
LINK-EDIT PROGRAM MODULES	62
DETERMINE CAUSE OF APPLICATIONS SYSTEM SOFTWARE MALFUNCTIONS	62
ALLOCATE COMPUTER FILES, SUCH AS DATA OR PROGRAM FILES	62
ANALYZE USER REQUIREMENTS IN CONCEPTUALIZING OR DEFINING SOFTWARE/HARDWARE REQUIREMENTS	60
DRAFT, WRITE, OR UPDATE INTERNAL SOURCE PROGRAM DOCUMENTATION, SUCH AS COMMENTS OR NOTES	53
DEVELOP METHODS TO INCREASE COMPUTER PROGRAM EFFICIENCY OR EFFECTIVENESS	42
DEVELOP COMPUTER PROGRAM PSEUDO CODE	39
RESEARCH MANUALS, DOCUMENTATION, OR TECHNICAL PUBLICATIONS TO AID IN PROBLEM ISOLATION OR CORRECTION	39

TABLE A17

DATA BASE ANALYSTS

GROUP SIZE: 27
NUMBER OF 26XX PERSONNEL: 9
NUMBER OF 27XX PERSONNEL: 3
NUMBER OF 28XX PERSONNEL: 8

PERCENT OF SAMPLE: 3
AVERAGE TAFMS: 117 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
ANALYZE DATA BASE STRUCTURES	100
DESIGN OR MODIFY DATA BASES TO MEET NEW APPLICATION NEEDS	89
MODIFY OR MAINTAIN DATA BASES OR DATA BASE FORMATS	89
MAINTAIN COMPUTER FILES, SUCH AS DATA OR PROGRAM FILES	89
DESIGN DATA BASE SPECIAL INQUIRY PROGRAMS	85
ASSIST USERS IN RESOLVING COMPUTER SOFTWARE MALFUNCTIONS OR PROBLEMS	85
DESIGN COMPUTER APPLICATIONS SOFTWARE TO FULFILL USER REQUIREMENTS	81
ADVISE USERS OF AVAILABLE DATA BASES	81
ANALYZE COMPUTER APPLICATIONS SOFTWARE FOR MODIFICATIONS	81
ALLOCATE COMPUTER FILES, SUCH AS DATA OR PROGRAM FILES	81
ENSURE OPERATIONAL DATA BASE INTEGRITY	74
IDENTIFY PROBLEMS WITH DATA STORAGE OR RETRIEVAL SYSTEMS	74
DEVELOP DATA BASE UPDATE PROCEDURES	74
ANALYZE USER REQUIREMENTS IN CONCEPTUALIZING OR DEFINING SOFTWARE/HARDWARE REQUIREMENTS	74
DEVELOP AND IMPLEMENT DATA BASE RETRIEVAL AND RECOVERY PROCEDURES	70

TABLE A18

SYSTEMS EVALUATION AND DEVELOPMENT PERSONNEL

GROUP SIZE: 49
PERCENT OF SAMPLE: 5
AVERAGE NUMBER OF TASKS PERFORMED:
AVERAGE TAFMS: 107 MONTHS
NUMBER OF 26XX PERSONNEL: 9
NUMBER OF 27XX PERSONNEL: 2
NUMBER OF 28XX PERSONNEL: 36

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
ANALYZE SYSTEM PERFORMANCE CHARACTERISTICS	90
CONDUCT OR PARTICIPATE IN OPERATIONAL TESTS OR EVALUATIONS	86
PARTICIPATE IN TECHNICAL INTERCHANGE MEETINGS (TIM)	63
EVALUATE TEST REPORTS	51
EVALUATE ACCEPTANCE TESTS ON SYSTEMS, SUBSYSTEMS, FACILITIES, OR EQUIPMENT	45
REVIEW VERIFICATION TESTS AND VALIDATION TESTS	37
EVALUATE VERIFICATION TESTS AND VALIDATION TESTS	33
MONITOR ACCEPTANCE TESTS ON SYSTEMS, SUBSYSTEMS FACILITIES, OR EQUIPMENT	33
EVALUATE VENDOR-SUPPLIED DOCUMENTATION OR PRODUCTS	31
MAINTAIN COMPUTER FILES, SUCH AS DATA OR PROGRAM FILES	31
REVIEW REQUIREMENTS DOCUMENTS, SUCH AS SOFTWARE REQUESTS, SON, SOW, SORD, MEN, OR ROC	29
EVALUATE FUNCTIONAL REQUIREMENTS DOCUMENTS/SPECIFICATION	29

TABLE A19

CONTRACTING OFFICERS

GROUP SIZE: 11
PERCENT OF SAMPLE: 1
AVERAGE NUMBER OF TASKS PERFORMED:
AVERAGE TAFMS: 124 MONTHS
NUMBER OF 26XX PERSONNEL: 1
NUMBER OF 27XX PERSONNEL: 2
NUMBER OF 28XX PERSONNEL: 8

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
COORDINATE WITH CONTRACTING OFFICERS ON CONTRACT SPECIFICATIONS	100
DRAFT OR WRITE INPUTS TO RFP ITEMS, SUCH AS CDRL, SOW, DID, CLIN, OR PWS	91
PREPARE STATEMENTS OF WORK (SOW) FOR PROGRAMS OR PROJECTS	91
PREPARE DD FORMS 254 (DOD CONTRACT SECURITY CLASSIFICATION SPECIFICATION)	82
DEVELOP REQUEST FOR PROPOSAL (RFP)	73
COORDINATE MODIFICATIONS TO CONTRACTS	73
EVALUATE SOW OR SPECIFICATIONS FOR SOLICITATIONS	73
COORDINATE WITH CUSTOMER ON RECEIPT OR NONRECEIPT OF CONTRACT DELIVERABLES	64
COORDINATE WITH LEGAL PERSONNEL OR CONTRACTING OFFICERS ON TECHNICAL ASPECTS OF CONTRACTS, BIDS, OR PROPOSALS	64
REVIEW DATA ITEM DESCRIPTIONS (DID)	64
REVIEW CONTRACTOR PROGRESS REPORTS	55
PREPARE TASKING STATEMENTS FOR CONTRACTS OR PROPOSALS	55
CONSOLIDATE RFP ITEM INPUTS, SUCH AS CDRL, SOW, DID, CLIN, OR PWS INPUTS	55
PREPARE JUSTIFICATION FOR LESS THAN FULL AND OPEN COMPETITION (SOLE SOURCE)	55

TABLE A20

DATA BASE MANAGERS

GROUP SIZE: 5
NUMBER OF 26XX PERSONNEL: 1
NUMBER OF 27XX PERSONNEL: 2
NUMBER OF 28XX PERSONNEL: 1

PERCENT OF SAMPLE: Less than 1%
AVERAGE TAFMS: 148 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
DEVELOP DATA BASE UPDATE PROCEDURES	100
DESIGN OR MODIFY DATA BASES TO MEET NEW APPLICATION NEEDS	100
DETERMINE METHODS OF ACCESSES TO DATA BASES	100
ENSURE OPERATIONAL DATA BASE INTEGRITY	80
COORDINATE WITH PROGRAM ELEMENT MONITORS	80
ANALYZE DATA BASE STRUCTURES	80
DESIGN DATA BASE SPECIAL INQUIRY PROGRAMS	80
DEVELOP DATA BASE SPECIFICATIONS	80
ASSIST USERS IN RESOLVING COMPUTER SOFTWARE MALFUNCTIONS OR PROBLEMS	80
MAINTAIN COMPUTER FILES, SUCH AS DATA OR PROGRAM FILES	60
PREPARE DATA BASE CHANGE REQUESTS	60
DETERMINE METHODS OF LIMITING ACCESSES TO DATA BASE/DATA ITEMS	60

APPENDIX B

TABLE B1

SOFTWARE MANAGER CLUSTER

GROUP SIZE: 217
NUMBER OF 491X PERSONNEL: 69
NUMBER OF 492X PERSONNEL: 122
NUMBER OF 493X PERSONNEL: 7
NUMBER OF 494X PERSONNEL: 22

PERCENT OF SAMPLE: 7
AVERAGE TAFMS: 133 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
EVALUATE COMPUTER SOFTWARE TEST PLAN	74
EVALUATE COMPUTER SOFTWARE REQUIREMENTS DOCUMENTATION	72
EVALUATE COMPUTER SOFTWARE SYSTEM SPECIFICATIONS	68
PARTICIPATE IN DESIGN ANALYSES, PROJECT TEAM MEETINGS, OR INTERNAL DESIGN REVIEW MEETINGS	63
PARTICIPATE IN COMPUTER PROGRAM CONFIGURATION BOARD MEETINGS	59
EVALUATE COMPUTER SOFTWARE, FUNCTIONAL DESCRIPTIONS	59
ANALYZE USER REQUIREMENTS IN CONCEPTUALIZING OR DEFINING SOFTWARE/HARDWARE REQUIREMENTS	59
CONDUCT OR PARTICIPATE IN SYSTEM REVIEWS	58
ENSURE PROGRAMS OR DOCUMENTATION COMPLY WITH STANDARDS	55
CONDUCT OR PARTICIPATE ON CONFIGURATION CONTROL BOARDS (CCB) OR CONFIGURATION CONTROL SUB-BOARDS (CCSB)	55
PARTICIPATE IN TECHNICAL INTERCHANGE MEETINGS (TIM)	55
DETERMINE REQUIREMENTS OR PROCEDURES FOR SOFTWARE CHANGES	52
EVALUATE VENDOR-SUPPLIED DOCUMENTATION OR PRODUCTS	45
PARTICIPATE IN TECHNICAL MEETINGS, SUCH AS INTEROPERABILITY MEETINGS ON PROGRAM OR PROJECT REVIEWS	45
REVIEW LIFE CYCLE DOCUMENTATION	45
COORDINATE WITH PROJECT OR PROGRAM MANAGER ON DOCUMENTATION OF SOFTWARE DEFICIENCIES	44

TABLE B2

SOFTWARE MAINTENANCE DIRECTORS

GROUP SIZE: 14
NUMBER OF 491X PERSONNEL: 9
NUMBER OF 492X PERSONNEL: 5
NUMBER OF 493X PERSONNEL: 0
NUMBER OF 494X PERSONNEL: 0

PERCENT OF SAMPLE: Less than 1%
AVERAGE TAFMS: 169 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
EVALUATE COMPUTER SOFTWARE REQUIREMENTS DOCUMENTATION	93
DIRECT SOFTWARE MAINTENANCE OF COMMUNICATIONS-COMPUTER SYSTEMS	86
PARTICIPATE IN DESIGN ANALYSES, PROJECT TEAM MEETINGS, OR INTERNAL DESIGN REVIEW MEETINGS	79
PARTICIPATE IN COMPUTER PROGRAMS CONFIGURATION BOARD MEETINGS	79
ANALYZE USER REQUIREMENTS IN CONCEPTUALIZING OR DEFINING SOFTWARE/HARDWARE REQUIREMENTS	71
CONDUCT OR PARTICIPATE ON CONFIGURATION CONTROL BOARDS (CCB) OR CONFIGURATION CONTROL SUB-BOARDS (CCSB)	71
TRACK STATUS OF CORRECTIVE ACTIONS FOR COMMUNICATIONS-COMPUTER SYSTEMS DISCREPANCIES	57
EVALUATE SOLUTIONS TO CHANGE PROPOSALS OR PROBLEM REPORTS	57
ASSIST USERS IN RESOLVING COMPUTER SOFTWARE MALFUNCTIONS OR PROBLEMS	57
ESTABLISH TECHNICAL WORKING GROUPS	57
PARTICIPATE ON TEST REVIEW BOARDS	57
EVALUATE REQUESTS FOR EMERGENCY SOFTWARE MAINTENANCE ASSISTANCE	57
ORGANIZE OR APPOINT TEST TEAMS	50
DEFEND PROGRAM OR PROJECT SCHEDULES OR MILESTONES	50
PARTICIPATE IN TECHNICAL USER GROUPS	50
CONDUCT OR PARTICIPATE IN SYSTEM REVIEWS	50

TABLE B3

SOFTWARE QUALITY ASSURANCE OFFICERS

GROUP SIZE: 70
NUMBER OF 491X PERSONNEL: 24
NUMBER OF 492X PERSONNEL: 35
NUMBER OF 493X PERSONNEL: 1
NUMBER OF 494X PERSONNEL: 10

PERCENT OF SAMPLE: 2
AVERAGE TAFMS: 137 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
EVALUATE COMPUTER SOFTWARE TEST PLAN	100
EVALUATE COMPUTER SOFTWARE SYSTEM SPECIFICATIONS	97
EVALUATE COMPUTER SOFTWARE REQUIREMENTS DOCUMENTATION	97
EVALUATE COMPUTER SOFTWARE FUNCTIONAL DESCRIPTIONS	87
CONDUCT OR PARTICIPATE IN SYSTEM REVIEWS	81
ANALYZE USER REQUIREMENTS IN CONCEPTUALIZING OR DEFINING SOFTWARE/HARDWARE REQUIREMENTS	76
PARTICIPATE IN DESIGN ANALYSES, PROJECT TEAM MEETINGS, OR INTERNAL DESIGN REVIEW MEETINGS	74
REVIEW LIFE CYCLE DOCUMENTATION	74
PARTICIPATE IN TECHNICAL INTERCHANGE MEETINGS (TIM)	71
EVALUATE OPERATIONS OR MAINTENANCE CONCEPTS	71
EVALUATE FUNCTIONAL DESCRIPTIONS	70
PARTICIPATE IN TECHNICAL MEETINGS, SUCH AS INTEROPERABILITY MEETINGS ON PROGRAM OR PROJECT REVIEWS	69
EVALUATE IMPLEMENTATION SUPPORT PLANS	67
ENSURE PROGRAMS OR DOCUMENTATION COMPLY WITH STANDARDS	66
EVALUATE VENDOR-SUPPLIED DOCUMENTATION OR PRODUCTS	64

TABLE B4

CONFIGURATION MANAGEMENT PERSONNEL

GROUP SIZE: 24
NUMBER OF 491X PERSONNEL: 2
NUMBER OF 492X PERSONNEL: 19
NUMBER OF 493X PERSONNEL: 0
NUMBER OF 494X PERSONNEL: 3

PERCENT OF SAMPLE: *
AVERAGE TAFMS: 125 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
COORDINATE WITH PROJECT OR PROGRAM MANAGER ON DOCUMENTATION OF SOFTWARE DEFICIENCIES	88
DETERMINE REQUIREMENTS OR PROCEDURES FOR SOFTWARE CHANGES	88
PLAN COMPUTER SOFTWARE RELEASES	83
PARTICIPATE IN COMPUTER PROGRAM CONFIGURATION BOARD MEETINGS	83
INVENTORY COMPUTER SOFTWARE OR SOFTWARE RELEASES	79
CONDUCT OR PARTICIPATE ON CONFIGURATION CONTROL BOARDS (CCB) OR CONFIGURATION CONTROL SUB-BOARDS (CCSB)	75
EVALUATE COMPUTER SOFTWARE TEST PLAN	75
ENSURE PROGRAMS OR DOCUMENTATION COMPLY WITH STANDARDS	71
CONSOLIDATE CHANGES OR PATCHES FOR NEW RELEASES	71
PREPARE OR VERIFY VERSION DESCRIPTION DOCUMENTS (VDD)	71
DRAFT OR WRITE CONFIGURATION MANAGEMENT PLANS	67
ESTABLISH OR MAINTAIN AUDIT TRAILS	67
PREPARE CHANGE PACKAGES FOR RELEASE OR IMPLEMENTATION OF COMPUTER HARDWARE OR SOFTWARE	67
IDENTIFY COMPUTER HARDWARE/SOFTWARE FOR CONFIGURATION CONTROL	67
PARTICIPATE IN DESIGN ANALYSES, PROJECT TEAM MEETINGS, OR INTERNAL DESIGN REVIEW MEETINGS	67

TABLE B5

SOFTWARE DEVELOPMENT CLUSTER

GROUP SIZE: 859
NUMBER OF 491X PERSONNEL: 69
NUMBER OF 492X PERSONNEL: 126
NUMBER OF 493X PERSONNEL: 26
NUMBER OF 494X PERSONNEL: 34

PERCENT OF SAMPLE: 29
AVERAGE TAFMS: 91 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
ESTIMATE TIME OR RESOURCES REQUIRED TO SATISFY COMMUNICATIONS-COMPUTER SYSTEMS TASKINGS OR REQUESTS	43
PREPARE TEMPORARY FIXES TO SOFTWARE SYSTEM DEFICIENCIES OR PROBLEMS, SUCH AS PATCH	42
CONDUCT COMPUTER SOFTWARE APPLICATION FEASIBILITY STUDIES	41
EVALUATE VENDOR SUPPLIED DOCUMENTATION OR PRODUCTS	41
ANALYZE MEMORY DUMPS	41
DEVELOP TEST DATA TO SIMULATE FUNCTIONAL REQUIREMENTS	38
PREPARE INPUTS TO SOFTWARE VERSION DESCRIPTION DOCUMENTATION OR USERS MANUALS	38
DRAFT, WRITE, OR UPDATE PROGRAM MODIFICATION REQUESTS OR COMPUTER SUPPORT REQUESTS	37
PROVIDE TECHNICAL SOFTWARE EXPERTISE TO EXTERNAL AGENCIES	37
DETERMINE CAUSE OF OPERATING SYSTEM SOFTWARE MALFUNCTIONS	36
DRAFT, WRITE, OR UPDATE FUNCTIONAL DESCRIPTIONS OR DATA REQUIREMENTS DOCUMENTS	35
DRAFT, WRITE, OR UPDATE SYSTEM SPECIFICATIONS	34
DETERMINE REQUIREMENTS OR PROCEDURES FOR SOFTWARE CHANGES	33
ANALYZE COMPUTER OPERATING SYSTEMS SOFTWARE FOR MODIFICATIONS	33
ANALYZE COMPUTER HARDWARE SYSTEMS FOR MODIFICATIONS	31
PARTICIPATE IN TECHNICAL USER GROUPS	31

TABLE B6

APPLICATIONS PROGRAMMERS

GROUP SIZE: 684
NUMBER OF 491X PERSONNEL: 48
NUMBER OF 492X PERSONNEL: 588
NUMBER OF 493X PERSONNEL: 14
NUMBER OF 494X PERSONNEL: 27

PERCENT OF SAMPLE: 23
AVERAGE TAFMS: 90 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
COMPILE OR ASSEMBLE COMPUTER PROGRAMS	92
ANALYZE COMPUTER APPLICATIONS SOFTWARE FOR MODIFICATIONS	88
WRITE OR MODIFY COMPUTER SOURCE CODE	86
TEST AND DEBUG PROGRAM MODULES	84
ASSIST USERS IN RESOLVING COMPUTER SOFTWARE MALFUNCTIONS OR PROBLEMS	84
DETERMINE CAUSE OF APPLICATIONS SYSTEM SOFTWARE MALFUNCTIONS	84
DESIGN COMPUTER APPLICATIONS SOFTWARE TO FULFILL USER REQUIREMENTS	83
ANALYZE USER REQUIREMENTS IN CONCEPTUALIZING OR DEFINING SOFTWARE/HARDWARE REQUIREMENTS	78
MAINTAIN COMPUTER FILES, SUCH AS DATA OR PROGRAM FILES	76
ALLOCATE COMPUTER FILES, SUCH AS DATA OR PROGRAM FILES	70
DRAFT, WRITE, OR UPDATE INPUTS TO PROGRAM MANUALS OR HANDBOOKS, SUCH AS OPERATIONS OR MAINTENANCE MANUALS	67
DRAFT, WRITE, OR UPDATE INTERNAL SOURCE PROGRAM DOCUMENTATION, SUCH AS COMMENTS OR NOTES	66
RESEARCH MANUALS, DOCUMENTATION, OR TECHNICAL PUBLICATIONS TO AID IN PROBLEM ISOLATION OR CORRECTION	64
LINK-EDIT PROGRAM MODULES	63
ANALYZE DATA BASE STRUCTURES	63
DEVELOP COMPUTER PROGRAM PSEUDO CODE	52
DETERMINE CORRECTIVE ACTIONS TO COMPUTER SYSTEM INCIDENT, DEFICIENCY, OR TROUBLE REPORTS	52

TABLE B7

SYSTEMS SOFTWARE ANALYSTS

GROUP SIZE: 24
NUMBER OF 491X PERSONNEL: 1
NUMBER OF 492X PERSONNEL: 23
NUMBER OF 493X PERSONNEL: 0
NUMBER OF 494X PERSONNEL: 0

PERCENT OF SAMPLE: Less than 1%
AVERAGE TAFMS: 86 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
ASSIST USERS IN RESOLVING COMPUTER SOFTWARE MALFUNCTIONS OR PROBLEMS	88
DETERMINE CORRECTIVE ACTIONS TO COMPUTER SYSTEM INCIDENT, DEFICIENCY, OR TROUBLE REPORTS	88
RESEARCH MANUALS, DOCUMENTATION, OR TECHNICAL PUBLICATIONS TO AID IN PROBLEM ISOLATION OR CORRECTION	79
DRAFT, WRITE, OR UPDATE RESPONSES TO PROBLEM OR ERROR REPORTS	75
DETERMINE CAUSE OF APPLICATIONS SYSTEM SOFTWARE MALFUNCTIONS	67
DETERMINE CAUSE OF OPERATING SYSTEM SOFTWARE MALFUNCTIONS	67
ANALYZE USER REQUIREMENTS IN CONCEPTUALIZING OR DEFINING SOFTWARE/HARDWARE REQUIREMENTS	67
ANALYZE COMPUTER APPLICATIONS SOFTWARE FOR MODIFICATIONS	63
PROVIDE TECHNICAL SOFTWARE EXPERTISE TO EXTERNAL AGENCIES	63
CONDUCT OR PARTICIPATE IN OPERATIONAL TESTS OR EVALUATIONS	63
COMPILE OR ASSEMBLE COMPUTER PROGRAMS	58
PROVIDE ASSISTANCE TO USERS ON NEW SYSTEM CHARACTERISTICS AND PERFORMANCE	54
MAINTAIN COMPUTER FILES, SUCH AS DATA OR PROGRAM FILES	54
DIRECT SOFTWARE MAINTENANCE OF COMMUNICATIONS-COMPUTER SYSTEMS	50
ANALYZE COMPUTER OPERATING SYSTEMS SOFTWARE FOR MODIFICATIONS	50

TABLE B8

CUSTOMER SUPPORT PERSONNEL

GROUP SIZE: 18
NUMBER OF 491X PERSONNEL: 2
NUMBER OF 492X PERSONNEL: 14
NUMBER OF 493X PERSONNEL: 0
NUMBER OF 494X PERSONNEL: 2

PERCENT OF SAMPLE: Less than 1%
AVERAGE TAFMS: 148 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
ASSIST USERS IN RESOLVING COMPUTER SOFTWARE MALFUNCTIONS OR PROBLEMS	100
DETERMINE CAUSE OF APPLICATIONS SYSTEM SOFTWARE MALFUNCTIONS	100
PROVIDE ASSISTANCE TO USERS ON NEW SYSTEM CHARACTERISTICS AND PERFORMANCE	94
DETERMINE CAUSE OF OPERATING SYSTEM SOFTWARE MALFUNCTIONS	94
ANALYZE USER REQUIREMENTS IN CONCEPTUALIZING OR DEFINING SOFTWARE/HARDWARE REQUIREMENTS	83
RESEARCH MANUALS, DOCUMENTATION, OR TECHNICAL PUBLICATIONS TO AID IN PROBLEM ISOLATION OR CORRECTION	78
SURVEY COMMERCIALLY AVAILABLE COMPUTER SOFTWARE/HARDWARE	72
EVALUATE VENDOR-SUPPLIED DOCUMENTATION OR PRODUCTS	72
ANALYZE COMPUTER APPLICATIONS SOFTWARE FOR MODIFICATIONS	72
PROVIDE TECHNICAL SOFTWARE EXPERTISE TO EXTERNAL AGENCIES	67
ANALYZE COMPUTER HARDWARE SYSTEMS FOR MODIFICATIONS	67
DETERMINE CORRECTIVE ACTIONS TO COMPUTER SYSTEM INCIDENT, DEFICIENCY, OR TROUBLE REPORTS	61
COORDINATE WITH VENDORS OR CONTRACTORS ON REPAIR OF EQUIPMENT	61
ALLOCATE COMPUTER FILES, SUCH AS DATA OR PROGRAM FILES	61
MAINTAIN COMPUTER FILES, SUCH AS DATA OR PROGRAM FILES	61

TABLE B9

CONTRACTING OFFICER CLUSTER

GROUP SIZE: 164
NUMBER OF 491X PERSONNEL: 54
NUMBER OF 492X PERSONNEL: 28
NUMBER OF 493X PERSONNEL: 20
NUMBER OF 494X PERSONNEL: 64

PERCENT OF SAMPLE: 6
AVERAGE TAFMS: 122 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
COORDINATE WITH CONTRACTING OFFICERS ON CONTRACT SPECIFICATIONS	72
COORDINATE WITH LEGAL PERSONNEL OR CONTRACTING OFFICERS ON TECHNICAL ASPECTS OF CONTRACTS, BIDS, OR PROPOSALS	52
EVALUATE CONTRACTOR COMPLIANCE WITH CONTRACT TERMS	51
EVALUATE SOW OR SPECIFICATIONS FOR SOLICITATIONS	43
DRAFT OR WRITE INPUTS TO RFP ITEMS, SUCH AS CDRL, SOW, DID, CLIN, OR PWS	43
COORDINATE MODIFICATIONS TO CONTRACTS	41
COORDINATE WITH VENDORS OR CONTRACTORS ON REPAIR OF EQUIPMENT	37
COORDINATE WITH CUSTOMER ON RECEIPT OR NONRECEIPT OF CONTRACT DELIVERABLES	34
DEVELOP REQUEST FOR PROPOSAL (RFP)	32
PROVIDE TECHNICAL EXPERTISE DURING CONTRACT NEGOTIATIONS	28
EVALUATE PURCHASE REQUESTS	26
MONITOR COMMERCIAL VENDOR SERVICES	25
OBSERVE CONTRACTOR DEMONSTRATIONS	25
PREPARE STATEMENTS OF WORK (SOW) FOR PROGRAMS OR PROJECTS	24

TABLE B10

CONTRACT COORDINATORS

GROUP SIZE: 34
NUMBER OF 491X PERSONNEL: 10
NUMBER OF 492X PERSONNEL: 4
NUMBER OF 493X PERSONNEL: 0
NUMBER OF 494X PERSONNEL: 20

PERCENT OF SAMPLE: 1
AVERAGE TAFMS: 108 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
COORDINATE WITH CONTRACTING OFFICERS ON CONTRACT SPECIFICATIONS	97
COORDINATE WITH VENDORS OR CONTRACTORS ON REPAIR OF EQUIPMENT	91
COORDINATE WITH CUSTOMER ON RECEIPT OR NONRECEIPT OF CONTRACT DELIVERABLES	68
COORDINATE MODIFICATIONS TO CONTRACTS	68
COORDINATE WITH LEGAL PERSONNEL OR CONTRACTING OFFICERS ON TECHNICAL ASPECTS OF CONTRACTS, BIDS, OR PROPOSALS	68
EVALUATE CONTRACTOR COMPLIANCE WITH CONTRACT TERMS	65
EVALUATE PURCHASE REQUESTS	53
EVALUATE SOW OR SPECIFICATIONS FOR SOLICITATIONS	53
MONITOR COMMERCIAL VENDOR SERVICES	50
PREPARE JUSTIFICATION FOR LESS THAN FULL AND OPEN COMPETITION (SOLE SOURCE)	50
DRAFT OR WRITE INPUTS TO RFP ITEMS, SUCH AS CDRL, SOW, DID, CLIN, OR PWS	38
RESPOND TO CONTRACTOR INQUIRIES ON CONTRACTING MATTERS	38
REQUEST TERMINATION OF CONTRACTS	35
DEVELOP REQUEST FOR PROPOSAL (RFP)	35

TABLE B11

REQUEST FOR PROPOSAL CONTRACTING OFFICERS

GROUP SIZE: 27
NUMBER OF 491X PERSONNEL: 7
NUMBER OF 492X PERSONNEL: 2
NUMBER OF 493X PERSONNEL: 11
NUMBER OF 494X PERSONNEL: 7

PERCENT OF SAMPLE: Less than 1%
AVERAGE TAFMS: 91 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
DRAFT OR WRITE INPUTS TO RFP ITEMS, SUCH AS CDRL, SOW, DID, CLIN, OR PWS	96
PREPARE STATEMENTS OR WORK (SOW) FOR PROGRAMS OR PROJECTS	81
EVALUATE SOW OR SPECIFICATIONS FOR SOLICITATIONS	74
COORDINATE WITH CONTRACTING OFFICERS ON CONTRACT SPECIFICATIONS	67
PROVIDE TECHNICAL EXPERTISE DURING CONTRACT NEGOTIATIONS	67
PARTICIPATE ON SOURCE SELECTION BOARDS, SUCH AS SOURCE SELECTION EVALUATION BOARDS (SSEB) OR SSAC	63
DEVELOP REQUEST FOR PROPOSAL (RFP)	59
OBSERVE CONTRACTOR DEMONSTRATIONS	52
CONSOLIDATE RFP ITEM INPUTS, SUCH AS CDRL, SOW, DID, CLIN, OR PWS INPUTS	48
COORDINATE WITH LEGAL PERSONNEL OR CONTRACTING OFFICERS ON TECHNICAL ASPECTS OF CONTRACTS, BIDS, OR PROPOSALS	44
BRIEF AT PROGRAM MANAGEMENT REVIEWS	44
PERFORM TECHNICAL OR MANAGEMENT EVALUATIONS OF CONTRACT PROPOSALS	41
COORDINATE SOURCE SELECTION PLANS (SSP)	41
PARTICIPATE IN PROPOSAL REVIEWS OR MURDER BOARDS	37

TABLE B12

CONTRACTOR ASSESSMENT PERSONNEL

GROUP SIZE: 11
NUMBER OF 491X PERSONNEL: 4
NUMBER OF 492X PERSONNEL: 0
NUMBER OF 493X PERSONNEL: 0
NUMBER OF 494X PERSONNEL: 7

PERCENT OF SAMPLE: Less than 1%
AVERAGE TAFMS: 147 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
EVALUATE CONTRACTOR COMPLIANCE WITH CONTRACT TERMS	100
PERFORM CONTRACTOR PERFORMANCE ASSESSMENTS	73
COORDINATE WITH CONTRACTING OFFICERS ON CONTRACT SPECIFICATIONS	73
DRAFT OR WRITE CERTIFICATES OF SERVICE	64
REVIEW CONTRACTOR DISCREPANCY REPORTS	55
COORDINATE MODIFICATIONS TO CONTRACTS	45
DRAFT OR WRITE INPUTS TO RFP ITEMS, SUCH AS CDRL, SOW, DID, CLIN, OR PWS	45
COORDINATE WITH VENDORS OR CONTRACTORS ON REPAIR OF EQUIPMENT	36
RESPOND TO CONTRACTOR INQUIRIES ON CONTRACTING MATTERS	36
COORDINATE WITH LEGAL PERSONNEL OR CONTRACTING OFFICERS ON TECHNICAL ASPECTS OF CONTRACTS, BIDS, OR PROPOSALS	27
REVIEW CONTRACTOR PROGRESS REPORTS	27
MONITOR LOCAL CONTRACTS FOR SITE SUPPORT ACTIVITIES	27
DRAFT OR WRITE INPUTS TO CONTRACTOR DISCREPANCY REPORTS	27
EVALUATE SOW OR SPECIFICATIONS FOR SOLICITATIONS	18
REVIEW QUALITY ASSURANCE EVALUATOR (QAE) OR QUALITY CONTROL (QC) REPORTS FOR INSTALLATIONS	18
REVIEW REQUESTS FOR PROGRAM OR PROJECT ASSISTANCE	9

TABLE B13

PROGRAM AND PROJECT MANAGERS

GROUP SIZE: 276
NUMBER OF 491X PERSONNEL: 102
NUMBER OF 492X PERSONNEL: 27
NUMBER OF 493X PERSONNEL: 25
NUMBER OF 494X PERSONNEL: 124

PERCENT OF SAMPLE: 9
AVERAGE TAFMS: 148 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
COORDINATE WITH SUPPORTING ACTIVITIES ON THEIR ABILITY TO SUPPORT SYSTEMS, SUBSYSTEMS, FACILITIES, OR EQUIPMENT	75
CONDUCT PROGRAM MANAGEMENT MEETINGS OR WORKING GROUPS	71
BRIEF AT PROGRAM MANAGEMENT REVIEWS	70
DEFEND PROGRAM OR PROJECT SCHEDULES OR MILESTONES	67
MAINTAIN OR UPDATE PROGRAM OR PROJECT FOLDERS	66
PARTICIPATE IN TECHNICAL MEETINGS, SUCH AS INTEROPERABILITY MEETINGS ON PROGRAM OR PROJECT REVIEWS	62
COORDINATE WITH CIVILIAN COMPANIES ON COMMUNICATIONS-COMPUTER SYSTEMS MATTERS	60
COORDINATE WITH PROGRAM ELEMENT MONITORS	58
ESTIMATE IMPACT ON PROGRAMS OR PROJECTS DUE TO DELAYS	58
EVALUATE PROGRAM DOCUMENTS, SUCH AS PROGRAM MANAGEMENT DIRECTIVES (PMD) OR PROGRAM MANAGEMENT PLANS (PMP)	55
RESOLVE PROGRAM OR PROJECT MILESTONE CONFLICTS	54
EVALUATE EFFECT OF FUNDING CUTS ON PROGRAMS OR PROJECTS	50
MONITOR PROGRESS OF CSRD, SON, OR CHANGE PROPOSALS OR REQUESTS	50
OBSERVE CONTRACTOR DEMONSTRATIONS	47
REPORT STATUS OF PROGRAM MANAGER MILESTONES	47
EVALUATE OPERATIONS OR MAINTENANCE CONCEPTS	47

TABLE B14

ACQUISITION PROGRAM MANAGERS

GROUP SIZE: 319
NUMBER OF 491X PERSONNEL: 112
NUMBER OF 492X PERSONNEL: 73
NUMBER OF 493X PERSONNEL: 49
NUMBER OF 494X PERSONNEL: 99

PERCENT OF SAMPLE: 11
AVERAGE TAFMS: 141 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
CONDUCT PROGRAM MANAGEMENT MEETINGS OR WORKING GROUPS	79
ESTIMATE IMPACT ON PROGRAMS OR PROJECTS DUE TO DELAYS	78
DEFEND PROGRAM OR PROJECT SCHEDULES OR MILESTONES	77
COORDINATE WITH CIVILIAN COMPANIES ON COMMUNICATIONS-COMPUTER SYSTEMS MATTERS	77
BRIEF AT PROGRAM MANAGEMENT REVIEWS	77
PARICIPATE IN TECHNICAL MEETINGS, SUCH AS INTEROPERABILITY MEETINGS ON PROGRAM OR PROJECT REVIEWS	74
COORDINATE WITH CONTRACTING OFFICERS ON CONTRACT SPECIFICATIONS	74
COORDINATE WITH SUPPORTING ACTIVITIES ON THEIR ABILITY TO SUPPORT SYSTEMS, SUBSYSTEMS, FACILITIES, OR EQUIPMENT	73
OBSERVE CONTRACTOR DEMONSTRATIONS	73
EVALUATE EFFECT OF FUNDING CUTS ON PROGRAMS OR PROJECTS	70
RESOLVE PROGRAM OR PROJECT MILESTONE CONFLICTS	68
REPORT STATUS OF PROGRAM MANAGER MILESTONES	66
EVALUATE OPERATIONS OR MAINTENANCE CONCEPTS	66
MAINTAIN OR UPDATE PROGRAM OR PROJECT FOLDERS	66
PROVIDE TECHNICAL EXPERTISE DURING CONTRACT NEGOTIATIONS	66

TABLE B15

TESTING OFFICERS

GROUP SIZE: 167
NUMBER OF 491X PERSONNEL: 33
NUMBER OF 492X PERSONNEL: 65
NUMBER OF 493X PERSONNEL: 52
NUMBER OF 494X PERSONNEL: 17

PERCENT OF SAMPLE: 6
AVERAGE TAFMS: 119 MONTHS

THE FOLLOWING ARE IN DESCENDING ORDER BY PERCENT MEMBERS PERFORMING:

TASKS	PERCENT MEMBERS PERFORMING
CONDUCT OR PARTICIPATE IN OPERATIONAL TESTS OR EVALUATIONS	92
PREPARE TEST REPORTS	86
COORDINATE WITH APPROPRIATE AGENCIES OR PERSONNEL ON TEST RESULTS OR PROCEDURES	85
ANALYZE SYSTEM PERFORMANCE CHARACTERISTICS	78
ENSURE ADEQUATE SYSTEM RESOURCES ARE AVAILABLE TO SUPPORT TESTING	74
PERFORM TEST DATA ANALYSES	70
ORGANIZE OR APPOINT TEST TEAMS	65
CONDUCT PRETEST BRIEFINGS	59
DEVELOP TEST AND DIAGNOSTIC PLANS	58
PARTICIPATE ON TEST REVIEW BOARDS	52
CONDUCT VALIDATION AND VERIFICATION TESTS	49
ATTEND PROGRAM DEVELOPMENT CONFERENCES THROUGHOUT THE ACQUISITION PROCESS	48
CONDUCT PRETESTS	44
PERFORM ACCEPTANCE TESTS ON SYSTEMS, SUBSYSTEMS, FACILITIES, OR EQUIPMENT	43
EVALUATE COMPUTER SOFTWARE TEST PLAN	34
CONDUCT PARALLEL, REGRESSION, OR STRESS TESTS	26